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SEPTEMBER/OCTOBER 1997

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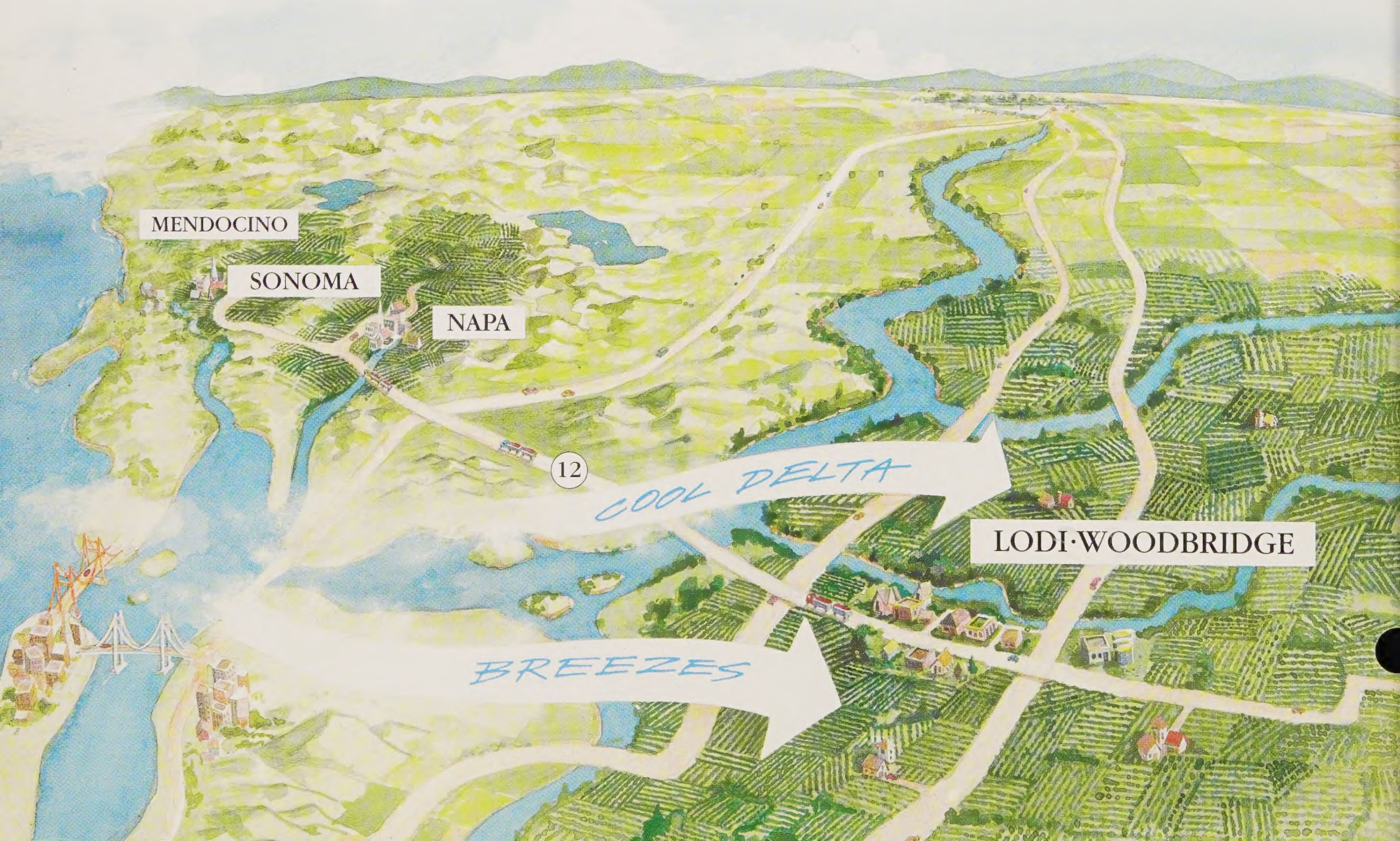

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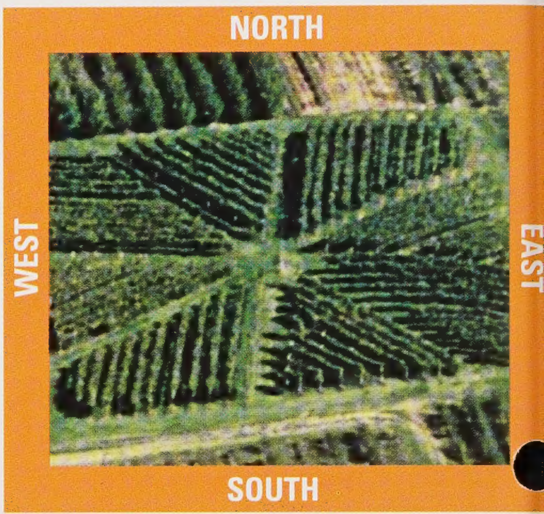

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"To stimulate continuing improvement in the wine industry."

Trouble in *paradise*

by Patrick Campbell

As usual, there's a fly in the ointment.

Never have more wines been available to more people around the U.S. For the past decade or so, wine lovers have had shipped to them just about any wine not locally available (which is to say, most older vintages and the wines of small producers) from out-of-state specialist retailers, internet merchants, and even directly from the producer. Behind the scenes, however, large, conglomerated wholesalers were busy cashing in their chits.

Citing the horrors of underage access to mail-order wines and lost excise tax revenues, state legislatures began paying back for the long time largesse of big distributorships. Bills were concocted to crack down on shipments from out of state, thereby ensuring the distributors' historical vise grip over distribution. For the past couple of years, Utah, Michigan, Massachusetts, Florida, Maryland, and Washington have launched sting operations against wineries, occasionally using the underage children of state officials as shills to "order" expensive wines at air freight prices.

More recently, Kentucky passed a bill to felonize out-of-state wineries who ship wine directly to a customer in Kentucky. Ship a wine, go to jail, and lose your winery license. The blitzkrieg followed in Georgia, which drew up another felony bill in record-breaking time; a few weeks later, Maryland slapped five-figure fines on two California wineries, each of whom had the audacity to ship a case of wine directly into the state. It is not unlikely that a score of other states will soon wield similar felony sledge hammers against the direct shipping gnat.

The level of angst reached an all-time high with the passage of Florida HB 725 in June 1997. While Maryland and New Jersey were saving their youth from mail-order evil, the legislature and governor of mighty Florida were caving in to the will of the state's powerful distributor lobby. Both the legislature and the governor ignored the counsel of the local press (who recognized a power play when they saw it), smaller distributors (who seem to fear healthy competition less than the mega-distributors do), the attorney general of Florida (who advised the governor to veto the bill on anti-competitive grounds), and consumers (who just want the wines they want, damn it, when they want them).

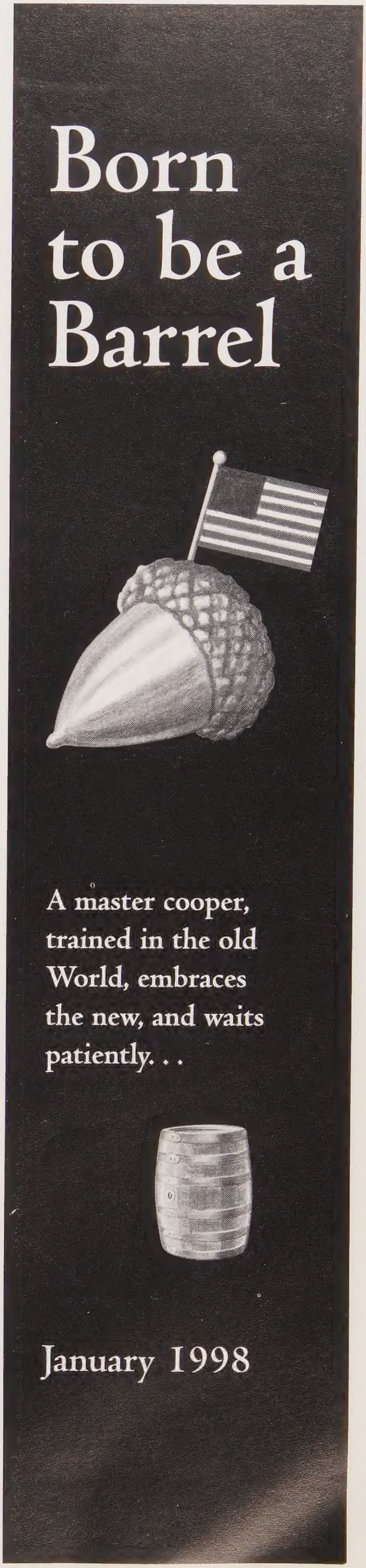
The hundreds of letters that flooded into Hizhonor's office from wineries, internet groups, and Florida wine lovers were no match, however, for the cozy relationships between the big distributors and their friends in high places. Money, cronyism, and monopoly talk in Florida, while freedom of choice, open commerce, and fair play walk.

And the situation is only becoming worse. Buoyed by the above noted spate of anti-consumer legislation, some 12 other states are drawing up their own felony bills under the guidance and insistence of their friends, the mega-wholesalers.

Folks outside the wine industry who are happy to pick up their jug of French Colombard in the supermarket may wonder what all the fuss is about. The lack of access to generally expensive wines by generally well-heeled individuals from generally privileged wineries may not register bright on the man-in-the-street's radar screen of outrage. But anyone who cares about democratic principles and free market issues will see in this tale of abuse shades of robber baron politics.

The story demands outrage, whether you care about wine or not. Strong distributors muscle into new territories and gobble up smaller fry; large producers dominate the attention of ever fewer distributors, thereby crowding out the smaller, and often the mid-sized, producers; consolidation of power leads to greater political clout by fewer players; and state legislatures kowtow to the increasingly large and ever-more-generous distributors. All of which spells a lack of choice for the consumer.

One might be tempted to draw parallels between this lugubrious scenario and Walmart's romp over the rural small fry of America. Clearly, other industries



Born to be a Barrel

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January 1998

consolidate. In their rush to dominate markets, large companies create a vacuum, which niche players rush to fill. Niche marketers champion the smaller and more unusual brands; instead of saturating entire markets with mass produced goods, they rely on multi-state distribution to targeted customers, often via mail order, the very practices that state legislatures assiduously squelch when the product is wine. Walmart dominates by capitalist power; mega-distributors guarantee the spoils of their domination by legislative sanction.

The situation in Florida underscores the lengths to which friendly relationships between mega-distributors and their pals in high places can go. Megas feel most welcome in Florida, as only the recipients of a de facto, government-sponsored monopoly could. Through years of hard work and strategic maneuvering, the Big Three have whittled down the competition: three companies dominate the market (of the 116 pages in the current *Florida Beverage Journal*, 90 are taken by the Big Three), leaving a handful of small distributors to pick up the crumbs.

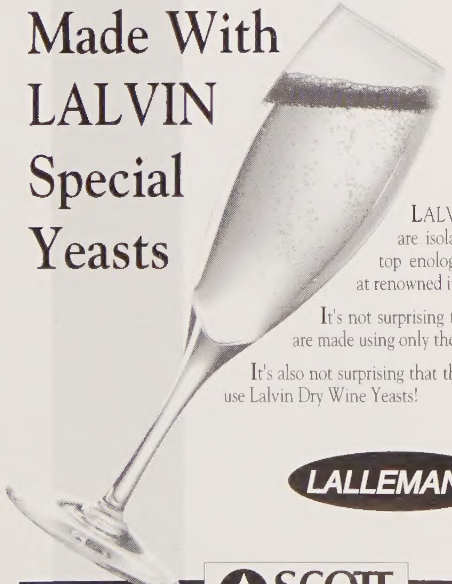
Not content with having knocked off the competition, however (nor with limiting their reach to Florida alone — the Big Three have gobbled up 12 other markets), they are reinforcing their bulwarks with political muscle. The "Distributor Qualification Bill" of 1996 (section 560.411 of the Florida statutes) all but guarantees them freedom from potential competition.

Want to introduce some small domaines of the Mediterranean to the Sunshine State? Please consider the following: all new distributors must keep no less than $100,000 worth of inventory in their warehouse at all times; said inventory must be sold to no fewer than 25% of all the retail accounts in the county where the distributorship is located; and 50% of sales must be in lots of less than 10 cases.

Translation: plan on supplying 7-11s and other fine wine purveyors with Cotes de Provence's best, and pray that sales don't deplete the warehouse too fast. Better yet, appoint one of the Big Three to sell the stuff. They will be more than happy to lend a hand. Oops, the big suppliers want the full attention of the sales staff? Oh well, *tant pis*, pal. The wine lovers didn't need all that exotic wine anyway. And don't forget: long-term lodging is available for you *chez* State of Florida should you attempt to circumvent the law.

Naturally, the wine industry (not to mention the wine lover, who has more freedom to ship semi-automatic weapons than wine across state lines) is shellshocked and beginning to strike out in frustration. Smaller wineries legitimately feel the most vulnerable: unable to gain the attention of distributors and deprived of any legal means of introducing out of state consumers to their wines, hundreds of American wineries have been effectively denied a fair chance to compete in the marketplace.

Stay tuned for the fireworks. In the mean time, wineries might think twice before signing on automatically with the mega that has just gobbled up their former distributor. ■



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How ROW ORIENTATION and TRELLISING

affect growth, yield, quality, and dry matter partitioning in Chardonnay vines

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Several studies have investigated the effects of row orientation on the performance of orchard and vineyard systems with differing results. Computer simulation has shown that, in most cases, light would be distributed more evenly and absorbed more efficiently in N-S rather than E-W-oriented hedgerows at latitudes between 34 and 51.3°N.[3,9]

P.B. Lombard and M.N. Weastwood and, later, J.V. Christensen confirmed these findings, reporting a considerable increase in yield of pears and apples in N-S as opposed to E-W rows at latitudes of 42°N and 55.3°N, respectively.[10,4]

A.S. Devyatov and A.V. Gorny, working in Minsk (53.8°N), found yield in apples increased with E-W rather than with N-S rows by 16% to 35%, depending on cultivar.[6] Further, T.M. De Jong and J.F. Doyle did not find differences in the total amount of light intercepted by N-S and E-W-oriented peach rows at the latitude of Fresno (36.4°N).[5]

These contradictory results may be generated by the complex interaction of row orientation and such factors as the hedgerow height-row spacing ratio,[2,14] canopy density, latitude, and time of year. (Magnanini and Intrieri, 1987). The complexity of these interactions is highlighted by J.W. Palmer, who concluded that the effects of row orientation on light interception and distribution are likely to be more important at low latitudes and with tall hedgerows with wide alleyways than in short multi-row systems.[13]

Information regarding the effect of row orientation on grapevine performance under various growing conditions is very limited. A recent study at the latitude of Pully, Switzerland, showed a reducing effect on vigor, yield, and bunch rot in E-W rows regardless of trellis type, and that N-S rows trained to Lyre performed better than a traditional N-S hedgerow system.[12] The present study was designed to evaluate long-term effects of row orientation on performance of the simple curtain (SC) and spur-pruned cordon (SPC) training systems.

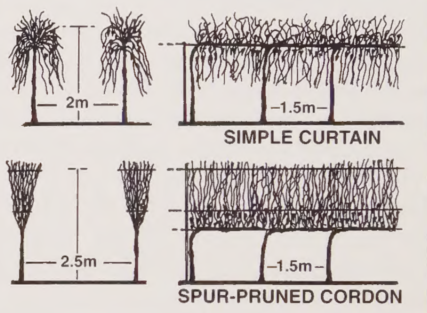
Materials and methods

Trials were done at the University of Bologna's experimental station (44.5°N lat.) from 1990 to 1993 in a non-sloping hillside vineyard (125 m a.s.l.) established in 1987 with the Chardonnay clone SMA 130 grafted to S04. Rows were oriented E-W, NW-SE, N-S, NE-SW, and both SC and SPC were employed in each orientation.

SC vines were spaced 1.5m apart with 2.0m between rows and with a permanent horizontal cordon wire set 1.7m above ground and no foliage wires. The SPC vines were spaced 1.5m apart with 2.5m between rows and with a permanent cordon 1.2m above ground; hedgerow height was 2.5m, and shoots were supported by two pairs of wires respectively placed 0.4m and 1.0m above the main support wire.

Layout of both systems resulted in an approximately 1.3m canopy with a maximum height equal to the inter-row spacing (*i.e.* 2.0m for the SC and 2.5m for the SPC). The SC shoots hung mainly downward, and shoots on the SPC grew upward (fig. 1). The training systems were the subplots in each of the two randomized block designs containing the four orientations. Each of the eight treatments corresponded to eight test vines, four per block.

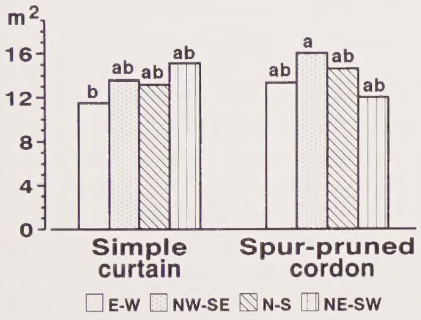
Figure 1 – SC and SPC system profiles



Vineyard mesoclimate was determined by measuring cumulated total radiation, mean air and soil temperature, relative humidity, and rainfall. These parameters were recorded by an automated weather station placed at the center of the field plot.

Ten spurs of two buds each were left per vine at winter pruning. Shoot and cluster number, yield per vine at harvest, node number per vine (corresponding to leaf number per vine) at the end of vegetative growth, weight of pruned wood, and average leaf size at peak vegetative growth (as the measure of leaf area of representative samples taken in each treatment with a portable Licor meter) were determined annually. Average berry weight, soluble solids, titratable acidity, and juice pH were recorded

Figure 2 – Leaf area per vine as related to training system and row orientation.



throughout each season and at harvest.

In 1993, a grape sample of about 100 kg from each treatment was used for microvinification. Chemical evaluation of total polyphenols and 17 volatile compounds in the head space of the wine samples was performed according to Montedoro and Bertuccioli (1983) and resulting data processed by Principal Component Analysis (PCA). The flavor profile technique (Amerine and Roessler, 1983) was used to determine the sensory attributes of the wines, and the data were processed by Generalized Procustes Analysis (GPA).

Given the fresh weight of canes, leaves, and bunches per vine, the dry matter (DM) content in the various plant organs was determined by oven-drying samples to constant weight and extrapolating the results to calculate the dry matter per vine. Trunk and cordon DM were indirectly determined by oven-drying pruned wood samples of known weight and volume and comparing the extent of DM to the annual volume growth of the trunk and cordon as estimated by measuring their circumference.

Variance analysis was applied to the data using the annual average values for the four vines in each subplot and processing them as strip-split-plot, where the year is the strip, the orientations are the plots, and the training systems are the sub-plots.

Results and discussion

Average trends of the climatic parameters confirm that the test site is typical of the Bologna hillside environment. The degree-days heat summation from April to October was about 2,000°C, and rainfall was well distributed throughout the growing season. Mean air temperature never exceeded 27 to 28°C during the hottest month, whereas relative humidity ranged from 50% to 65%. No limiting conditions to vine growth and grape ripening were recorded in the vineyard.

Vegetative performance data are shown in Table I. Shoot number per vine was higher in SC than in SPC. Leaf area per vine showed no significant differences in the two training systems and four orientations. Pruned wood weight and trunk cross-section area were fairly similar in the four orientations yet markedly lower in SC than in SPC.

Significant interactions of training system and row orientation were found for leaf area, pruned wood weight, and trunk cross-section area. The lowest leaf area per vine was recorded in E-W-oriented SC and the highest in the NW-SE-oriented SPC (fig.2). Leaf area development in the two systems began to differ about 15 days after shoot topping and kept increasing up to full canopy (fig.3).

Yield data are shown in Table II. No differences in shoot fruitfulness, average berry and bunch weight, and yield per vine were found between the two training systems. Row orientation affected cluster number per shoot and yield per vine, the peak values were found with NW-SE and the minimum with E-W. The crop reduction in the E-W oriented rows is consonant with the lower vigor of the corresponding vines. No significant effects on yield were recorded as a result of the interactions between the training system and row orientation.

Crop quality data are listed in Table III. Soluble solids, pH, and titratable acidity of juice were unaffected by training system or row orientation. The only interaction of these two factors was found in titratable acidity (TA), which was higher under NE-SW for SC and under EW and NW-SE for SPC. The berry ripening curves of the two training systems were very similar for juice °Brix and TA. The average heat-summation from budbreak to full ripening was about 1,650 degree-days, a fairly standard value for Chardonnay grapes.

Total dry matter per vine was affected by both training system and orientation (Table IV). It was lower in SC than in SPC and lowest under E-W orientation. The interaction of training

Table I –Vine growth data
Cv. Chardonnay – average 1990-'93

	Shoots per vine (No.)	Leaf area per vine (m^2)	Pruning weight per vine (kg)	Trunk-section area [(1)] (mm^2)
SC	20.8 a	13.3	0.97 b	649 b
SPC	19.3 b	14.0	1.43 a	751 a
	*	ns	**	**
E-W	20.6	12.4	1.11	677
NW-SE	19.6	14.7	1.31	750
N-S	19.8	13.9	1.21	699
NE-SW	20.3	13.5	1.16	674
	ns	ns	ns	ns
Interaction	ns	*	**	**

[(1)] Measured at the end of 1993 growing season

Table II –Yield data
Cv. Chardonnay – average 1990-'93

	Cluster per shoot (No.)	Berry weight (g)	Bunch weight (g)	Yield per vine (kg)
SC	1.36	1.59	154	4.7
SPC	1.31	1.61	162	4.8
	ns	ns	ns	ns
E-W	1.27 b	1.56	145	3.9 c
NW-SE	1.42 a	1.65	172	5.5 a
N-S	1.32 ab	1.58	156	4.9 b
NE-SW	1.35 ab	1.60	157	4.7 b
	**	ns	ns	**
Interaction	ns	ns	ns	ns

Mean separation by Duncan's Mulitple Range, t= ≤0.05, means followed by the same letter are not significantly different

Table III –Juice composition
Cv. Chardonnay – average 1990-'93

	Juice °Brix (%)	Juice pH	Juice TA (g / l)
SC	21.6	3.40	8.12
SPC	22.0	3.43	8.26
	ns	ns	ns
E-W	22.0	3.38	8.14
NW-SE	21.8	3.40	8.37
N-S	21.7	3.43	7.87
NE-SW	21.9	3.45	8.37
	ns	ns	ns
Interaction	ns	ns	ns

Table IV – Dry matter per vine and its partitioning
Cv. Chardonnay – average 1990-'93

	Total dry matter per vine (kg)	Partitioning			
		Trunk (%)	Canes (%)	Leaves (%)	Clusters (%)
SC	2.94 b	13.9 a	19.8 b	27.9	38.4 a
SPC	3.29 a	12.1 b	25.8 a	27.3	34.8 b
	**	**	**	ns	**
E-W	2.81 b	14.2	23.2	28.0	34.6
NW-SE	3.48 a	12.7	22.2	27.0	38.1
N-S	3.13 ab	12.6	22.6	27.6	37.2
NE-SW	3.04 ab	12.4	23.1	27.8	36.7
	*	ns	ns	ns	ns
Interaction	*	ns	ns	ns	ns

Figure 3 – Maximum and minimum leaf area development as related to training system and row orientation. Heat summation is also shown.

Cv. Chardonnay – average 1990-'93

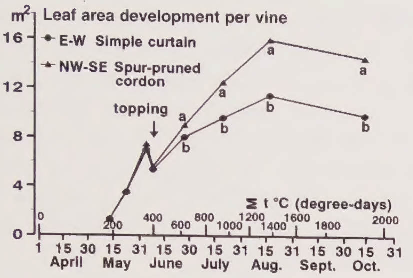
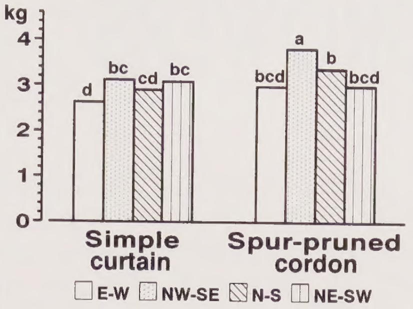


Figure 4 – Total dry matter per vine as related to training system and row orientation.

Dry matter per vine – average 1990-'93



system and orientation was significant and confirmed that the lowest DM was produced by the E-W oriented SC and the highest by the NW-SE oriented SPC (fig. 4).

Dry matter partitioning to trunks and clusters was greater on SC vines than on their counterparts in SPC, which instead showed higher DM in canes (Table IV), which might be acting as stronger sinks for assimilates because of their faster growth rate. Row orientation did not affect DM partitioning, and no significant interactions of orientation and training system were found for relative DM partitioning.

The 1993 chemical analysis of volatile compounds showed that the wines from the more vigorous SPC were slightly lower in linalool (except for NW-SE orientation) and somewhat richer in higher alcohols than SC samples. Accordingly, the SPC wines were less intense in peach, pineapple, and floral attributes than SC wines, although the differences were rather small and need to be re-assessed because, if confirmed, they would indicate a negative correlation between shoot growth rate and varietal aroma.

Conclusions

As reported in other studies on fruit species and grapevines, plant vigor and yield are reduced in E-W oriented rows, which in the present study was found in both the SC and SPC systems for Chardonnay.[10,4,12] For most parameters, however, SC was less influenced than SPC by the effects of row orientation. This finding may be attributable to SC's structure, which differs from the traditional hedgerow as it is without foliage wires and has a free and potentially more open canopy. This fact may have reduced the differences in light interception induced by row orientation at the tested latitude.

Noteworthy too is the dry matter partitioning in SC with respect to SPC. The latter showed a greater vine vigor essentially determined by the upward growth of the shoots, which likely represented a stronger sink than SC's mainly downward growing ones. SC on the other hand had its main sinks in the grape clusters and, to a lesser extent, the trunk.

Overall, the present findings indicate that SC, which is marked by a simpler structure and management approach,[7,8] can be a viable alternative to traditional systems like the SPC in that it has lower vigor, no variations in yield and grape quality, and similar or even slightly improved wine varietal character. Since SC is less affected than SPC by row orientation, it could also offer an advantage in establishing row direction in hillside vineyards, which makes management operations easier. ■

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Acidity, pH, and potassium for GRAPEGROWERS

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Department of Viticulture & Enology
University of California, Davis

Introduction

In the late 1970s, the fundamental relationships between total and titratable acidity, pH and the mineral content of grape juice and wine were explained.[1,2] Below we offer a brief recap of what these terms mean, how they are related, and how they are influenced by conditions and treatments in the vineyard and winery.

Definitions

- *Organic acids in grapes*

Fig. 1 shows that an organic acid consists of a carbon backbone — the negatively-charged "organic acid anion" and, in the case of tartaric or malic acid in grapes, two positively-charged hydrogen cations (H^+). In pure dried form, both anion and cations would stay together as a molecule, forming a crystalline powder. If dissolved in water, within the grape berry, for example, the molecule partly "ionizes" or "dissociates." That is anion and cations will float freely by themselves in the juice. The degree to which this separation of the two parts of an acid occurs is called "ionization" and depends on the individual type of acid and on the acidity of the juice, particularly its pH (see below).

If one or both hydrogen cations of the acid are exchanged with a mineral (metal), such as potassium (K^+) or sodium, the molecule is called a "salt." For example, the salt with greatest relevance to winemaking is potassium bitartrate, the potassium salt of tartaric acid, also known as "cream of tartar."

To simplify the content of this article, we will only consider the major players influencing acidity in grapes which are malic acid and tartaric acid and their potassium salts. We will neglect quantitatively less important organic acids such as acetic, succinic, citric, and lactic acid. Concentrations of other minerals, such as sodium or calcium, as well as the small pool of free hydrogen cations, will also be disregarded.

Tartaric acid and malic acid are quantitatively the most important organic acids in juice and wine. Tartrate is synthesized in the grape berry from carbohydrates, while malate is directly formed from CO_2 in young berry tissue. Both acids are enzymatically degraded by the vine during ripening, but malic acid is much more readily metabolized to generate energy and to synthesize carbohydrates. Therefore, the variety-specific ratio of tartaric acid to malic increases toward the final stages of ripening, especially in relatively hot regions or vintages.

- *Acidity measurements*

Total acidity is the combined amount of all organic acids and their salts found in a grape juice sample (fig. 1). While actually measuring the acid anions (tartrate, malate, etc.), total acidity accounts for all combinations of anions and their corresponding cations (hydrogen or potassium) (fig. 2). It is not normally measured in wineries, because the analysis involves more advanced techniques than required for the two traditional measures, titratable acidity and pH.

Titratable Acidity (T.A.) is a measurement of the total available amount of H^+ cations in solution. It is easily determined by titrating a grape juice sample with alkaline sodium hydroxide until a certain pH is reached (by convention in the U.S. pH 8.2). T.A. values in juices range on average from about 5 to 16 g/L, expressed as their tartaric acid equivalents.[10] However, this titration only accounts for the free organic acids and

FIGURE 1

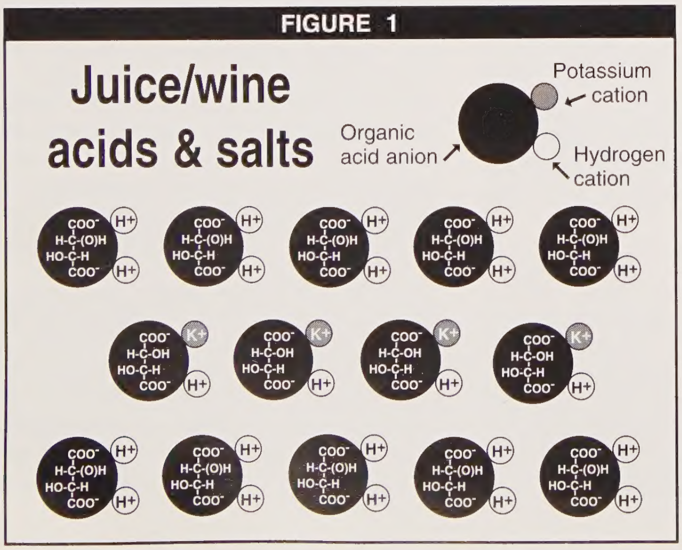
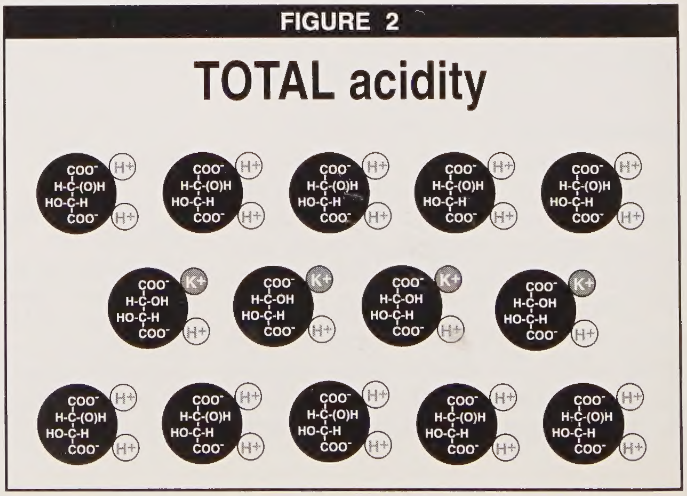


FIGURE 2



one-half of their salts, (fig. 3) depending on the extent of exchange.

Extent of Exchange — The percentage to which hydrogen has been replaced by potassium is the "Extent of Exchange" (fig. 5). On average, one-quarter to one-third of the acid hydrogen ions are exchanged with potassium. This portion does not show up in a titratable acidity measurement. If we look at an example of a titration curve (fig. 4) from juice pH 3.4 to 8.2, we can see that some of the acid was already neutralized by the potassium present in the grape. How this exchange takes place will be explained below.

•pH

pH is a measurement of the free H$^+$ ions in solution. pH is inversely related to (the logarithm of) the concentration of free hydrogen ions (H$^+$). This means the *lower* the pH, the *more* H$^+$ are present and the more acidic the sample. This value depends mainly on three factors:

1) The amount of tartaric acid that has its hydrogen ions exchanged against potassium (fig. 5). The more K$^+$ has replaced H$^+$, the higher the pH.

2) The ratio of tartaric to malic acid. Although both tartaric and malic acid have two hydrogen cations, tartaric is the stronger acid because it ionizes more freely at a lower pH. Thus, a higher ratio of tartaric to malic acid in a juice will result in a lower pH.

3) The relative *ionization* of malic and tartaric acids.

• Potassium (K$^+$)

Potassium is a mineral essential to plant growth which the vine uptakes and transports to all parts of the vine. It is present in the soil, taken up by the roots, and preferentially transported into leaves during development and berries during ripening.

Levels of potassium in California grapes range from 560 to 2,785 mg/L (average 1,846 mg/L),[10] while skins can contain over 9,000 mg/L in the outer layers.[11] The skin, while contributing only 10% of the berry weight, contains between 30% to 40% of the berry's potassium. This accounts for the lower T.A.s in press fractions or mechanically harvested fruit,[8] also in red wines fermented on their skins.

Acidity, pH, and potassium combined strongly influence the physical, chemical, and microbial stability of fruit and wine.[1,2,3,4,5,6]

Influence of T.A.

Of the two common measurements for acidity of juice, titratable acidity has a greater impact on the way the fruit, juice, and resulting wine tastes than does pH. Our perception of sourness is dependent on TA. As TA goes up, wine tastes more sour. Wine microbes, however, are unaffected by TA (fig. 6).[11]

In wine, perceived sourness decreases with higher concentrations of alcohol and residual sugar, while increased levels of phenolics and related astringency and bitterness enhance the tartness. It has been suggested that the different organic acids in a wine have different sensory properties and that they have different flavor characteristics in perceived sourness. However, most of the previous work looking at tartness or mouthfeel of these acids has overlooked their individually varying degrees of ionization at specific wine conditions. If one compares different organic acids found in wine at identical pHs and T.A.s, no major differences in their perceived sourness or astringency can be found.

Influence of pH

The most important factor when it comes to the microbial and chemical stability of wine is pH. It dictates directly how much of the sulfites added to a juice or wine are present as "molecular" sulfur dioxide (SO_2).[5] This form of SO_2 is the only one that kills unwanted yeast and bacteria. Unfortunately, the proportion of SO_2 present as molecular SO_2 diminishes exponentially as pH increases towards 4.0 (fig. 7), which results in increased requirements for sulfite additions measured as "free" SO_2 by the winemaker.

The lower the wine pH, the more effective is bentonite at removing haze-forming proteins, and wine color is more stable due to accelerated polymerization reactions versus oxidation reactions. Oxidative browning is slowed because of the presence of molecular SO_2 which is capable of scavenging oxidation products such as hydrogen peroxide.

Wine yeasts are relatively insensitive to pH changes while bacteria are highly restricted in their growth and fermentation abilities by lower pHs even without the presence of SO_2.

Within the range measured in California table wines, pH does not

FIGURE 3

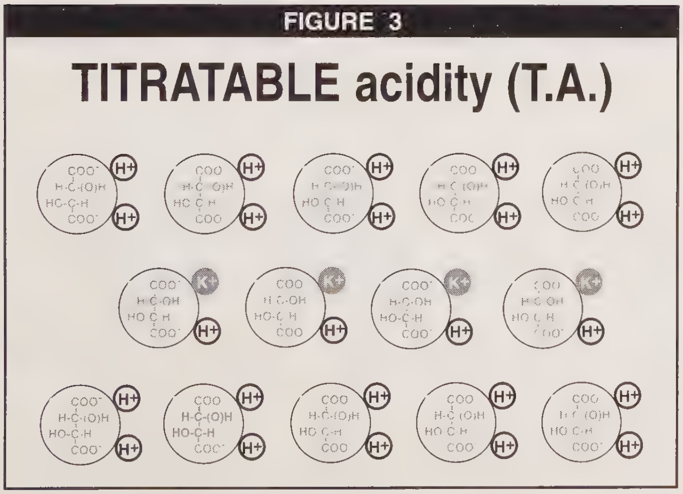
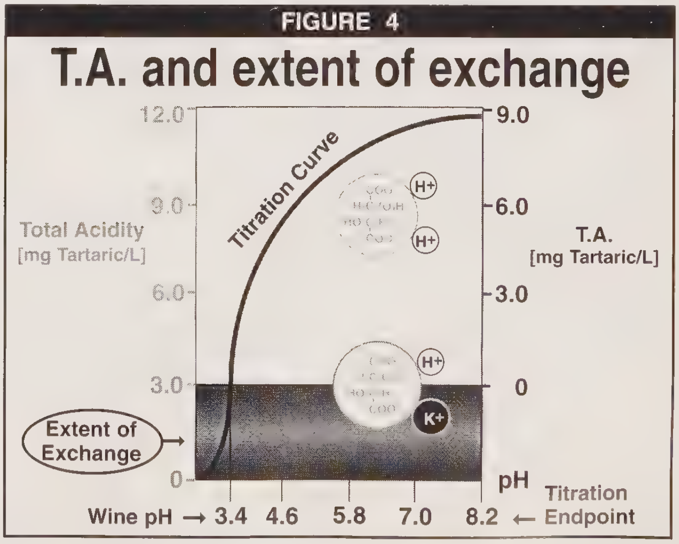

TITRATABLE acidity (T.A.)

FIGURE 4


T.A. and extent of exchange

have an impact on the taste properties of wine. Some winemakers take pride in keeping wine pHs above 3.6, dismissing suggestions to acidify as a compromise on flavor quality. However, acidification has traditionally been recommended to produce balanced and microbially stable wines, but not to encourage the production of especially tart wines. Again, it is not the lower pH achieved by acidification that influences the perceived sourness and subjective quality of the wine, it is the increase in Titratable Acidity. It is technically possible but not legally permitted — to reduce the pH with stronger inorganic acids, like sulfuric acid, in order to provide higher amounts of molecular SO_2, without significantly increasing T.A. and perceived sourness.

Influence of Potassium (K^+)

Grapevine enzymes (located in the roots) exchange hydrogen cations (H^+) with soil potassium (K^+), one to one, increasingly after veraison.[3] The reasons why the vine starts turning its tartaric acid into potassium bitartrate, the corresponding salt, are not completely clear, but they are related to transport systems that bring nutrients up into the vine and fruit. This phenomenon is typical for almost all agricultural crops and plants in general. As a negative side effect, in heavily farmed areas this exchange can lead to a decrease in soil pH and related problems.

By enzymatically transporting hydrogen out of the berries and then the vine, the grape juice becomes neutralized due to the exchange with neutral potassium (see fig. 5). Together with the concentration and composition of the organic acids in the berry, this exchange determines the pH actually measured in a must and its subsequent wine.

Another aspect of potassium's role in winemaking has recently been shown by Linda Bisson's group at UC Davis: Low potassium levels (<1,000 mg/L) in a juice in combination with very low pH (<3.0) can lead to sluggish or stuck fermentations, because yeast requires the potassium to maintain a neutral pH *within* the cell.[9] While these are conditions not normally encountered in California wineries, they may have significance in special situations such as the production of sparkling wine and brandy or wine produced from concentrate.

Influence of viticultural practices

The potassium content of vineyard soil and fertilization practices have only indirect influence on K^+ concentration in the berry and on juice pH. Since pH is not solely dependent on K^+ concentration alone, and the nutrient uptake mechanisms are very complex, an elimination of appropriate potas-

FIGURE 5

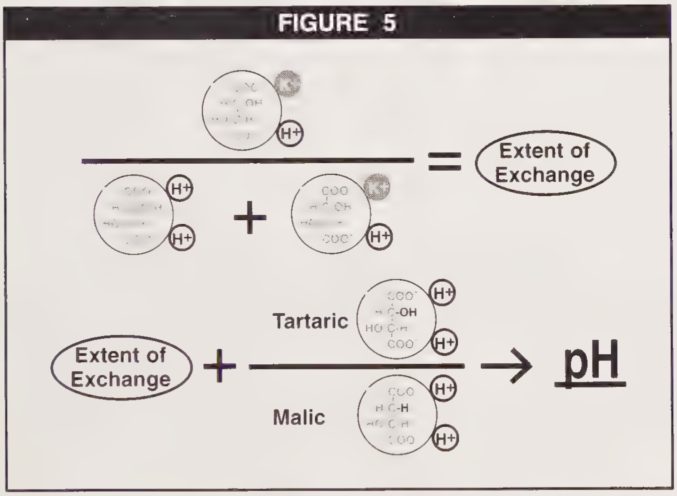


FIGURE 6

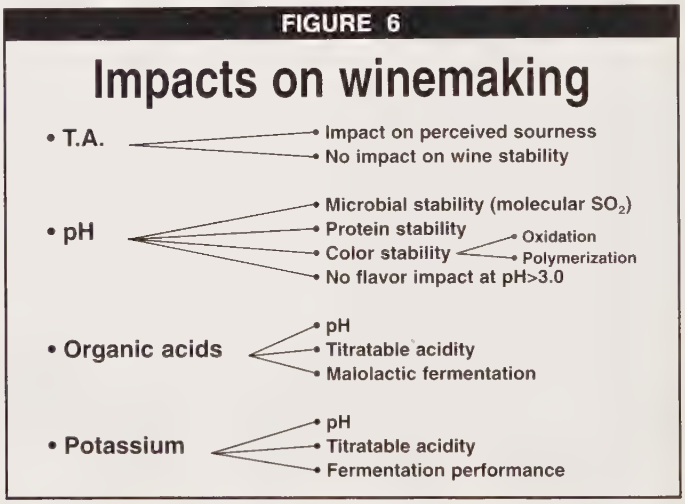

Impacts on winemaking
• T.A.
• Impact on perceived sourness
• No impact on wine stability
• pH
• Microbial stability (molecular SO2)
• Protein stability
• Color stability
• Oxidation
• Polymerization
• No flavor impact at pH>3.0
• Organic acids
• pH
• Titratable acidity
• Malolactic fermentation
• Potassium
• pH
• Titratable acidity
• Fermentation performance

FIGURE 7

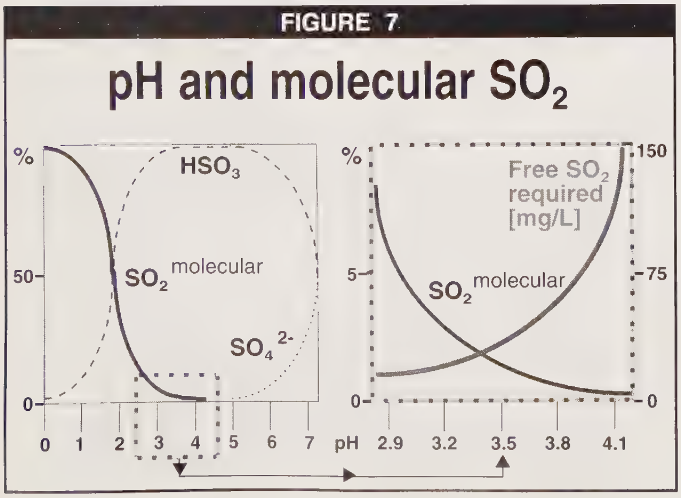
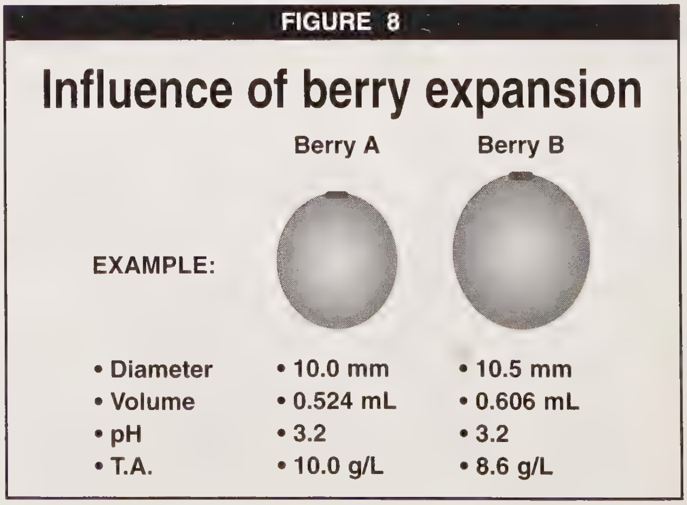

pH and molecular SO_2

FIGURE 8


Influence of berry expansion

	Berry A	Berry B
• Diameter	• 10.0 mm	• 10.5 mm
• Volume	• 0.524 mL	• 0.606 mL
• pH	• 3.2	• 3.2
• T.A.	• 10.0 g/L	• 8.6 g/L

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sium fertilization will not automatically lead to juices with higher acidity, but may adversely impact vine health and fermentation performance.

However, once the exchange enzymes in the roots are saturated with K$^+$, fertilization and/or potassium content of the soil have no impact on potassium accumulation in the vine. In fact, the rootstock itself has the most significant influence on potassium uptake. For example, vines planted on specific rootstocks can have almost twice as much bloom petiole potassium as vines planted on their own roots.[7] In addition, soil moisture content will affect potassium uptake as will a reduced active root area, caused by phylloxera or nematodes, for example.

Viticultural practices — vine placement, spacing, and cropping level — have been used to limit the uptake of potassium by competition. An example is the production of wine for brandy. In this situation, very low wine pH is desirable, partly because it keeps the wine microbially stable when SO_2 cannot be used.

A limited extent of exchange occurs because roots are competing with their neighbors and the potassium taken up has to be distributed over more clusters. In addition, chalky soils (example: Champagne [sparkling wine] and Cognac [brandy regions]), with low levels of potassium and high pH, also promote less exchange resulting in high T.A. and low pH must. However, potassium deficiencies for the grapevine or the wine yeast (see above) must be avoided.

Malic acid respiration normally occurs during ripening more rapidly in warm climates. This decreases both the Total Acidity and Titratable Acidity. The extent of exchange increases since there is less acid present with the same (or increasing) amount of K$^+$. Normally, this would cause the pH to rise but changes in the ratio between malic and the stronger tartaric acid often compensate, making the pH stay relatively constant. The pH will rise if there is significant potassium uptake at the same time as acid respiration. It may fall if there is faster production of malic and tartaric acid in the berry than mineral uptake, for instance after a rainfall or an irrigation just after veraison.

Berry size generally increases during ripening, but can vary significantly on a daily basis with either thermal expansion or water stress-related shrinkage during the day, or water influx and resulting expansion during the night. Fig. 8 shows the impact of berry expansion on pH and T.A.: small increases in berry diameter lead to dramatic increases in berry volume and therefore lower total acid concentrations, as well as lower T.A.

On the other hand, pH is determined by the *ratios* between tartaric and malic acid as well as the extent of exchange of their hydrogens with potassium. These ratios do not change with berry volume; the pH stays the same.

Three combinations of pH and T.A. levels can be generally expected under

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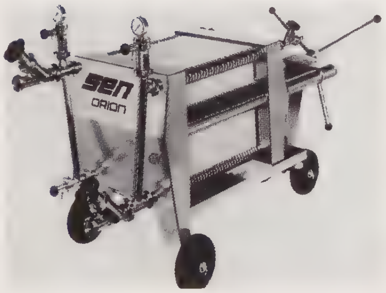

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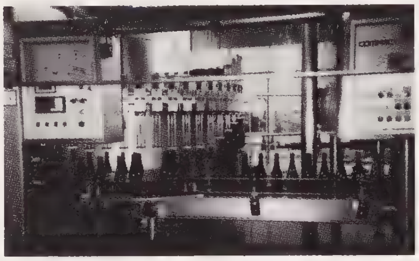

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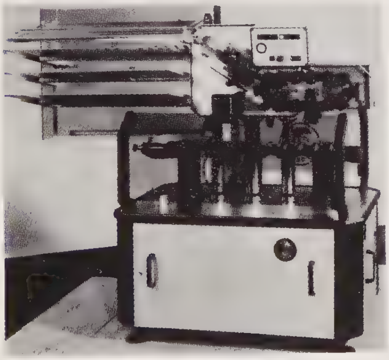

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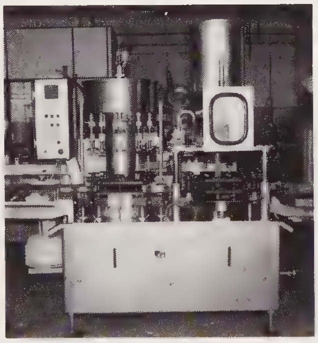

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certain conditions: over-mature fruit or hot climates can lead to a high pH and low T.A. due to acid respiration (see above), while early-harvested grapes or cool climates favor low pH and high T.A. due to high levels of unexchanged organic acids. However, in the case of a very long growing season in a cool climate, one might experience both a high T.A. and a high pH due to a large extent of exchange of accumulated acids with potassium.

Influence of enological practices

It is not possible to predict wine pH and T.A. from a known juice acidity measurement. This is mostly due to three major changes in acidity components during winemaking:

1. During fermentation, the yeasts utilize most of the grapes' amino acids and produce new organic acids, mostly succinic acid, partly at the expense of the stronger malic acid which the yeast can utilize. The carbon dioxide produced as part of the alcoholic fermentation is an acid itself, the CO_2 remaining dissolved in a wine can noticeably increase T.A.

2. If a malolactic fermentation (MLF) is induced, the conversion of malic acid into lactic acid and CO_2 leads to a decrease in acidity. This has long been utilized as a way of biological deacidification, although today winemakers use MLF more for its sensory contribution to the wine, while using the faster and more predictable ways mentioned below to lower acidity if desired. It is important to know before fermentation the percentage of the acidity due to malic acid, however.

3. Precipitation of potassium bitartrate will usually occur to some degree during and after fermentation due to the lower solubility of this salt at increased levels of alcohol and at lower temperatures. The loss of potassium bitartrate will reduce T.A., while the pH change will depend on the starting pH.

If the starting pH is less than 3.8 (practically 3.6 to 3.8, depending on the alcohol content), precipitation of K^+ bitartrate will cause the pH to fall; if the starting pH is greater than 3.8, the pH will rise; if the starting pH = 3.8, it will remain the same.

Acidification by addition of tartaric acid will cause a proportional amount of supersaturated potassium bitartrate to fall out of solution, thereby increasing T.A. while lowering pH.

Because of these complex, often incomplete interactions, most winemakers cannot easily predict or calculate the pH and T.A. after an addition of acid or a deacidification procedure. In order to do this, exact knowledge of the acid and mineral composition of the wine and of the physico-chemical (*ionization*) behavior of the acids is necessary.

In a practical winery setting, the winemaker may select from several options to change the pH or T.A. of a given juice or wine. Must acidification techniques include tartaric acid additions or hydrogen/potassium cation exchange, while deacidification options include potassium carbonate additions,

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fractional calcium carbonate additions, or anion exchange. These techniques are often employed in conjunction with the methods for potassium bitartrate stabilization.

Conclusion

This article is intended to show the relationships between different analytical measures for acidity and mineral composition used in the winery to make predictions about maturity of grapes, sensory properties, and stability of wines. It is hoped this review contributes to a better understanding of how basic viticultural and enological practices can influence and improve the quality of the final product we all cherish. ■

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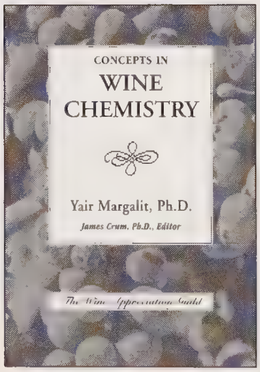

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Silver Oak PROSPERS in Napa/Sonoma

by Millie Howie

Prosperity grows on just one varietal vine at Silver Oak Cellars — Cabernet Sauvignon. Partners Justin Meyer and Ray Duncan grow grapes in two California locations — the Napa Valley and Alexander Valley in Sonoma County. They have a winery in each county, and each one produces one bottling of 100% Cabernet Sauvignon.

Silver Oak produces 48,000 cases annually, selling out every vintage (Napa Valley at $45 and Alexander Valley at $36) in just a few months. How have the Silver Oak partners achieved this success?

Photo by Mark McLane

"First you have to have a plan," says Meyer. "When we started Silver Oak, I decided we wouldn't put money into frills. We would keep costs down, buy barrels, hold the wine five years, and bottle a quality wine."

Neither partner planned to be in the wine business. Duncan's expertise is his entrepreneurial talent in oil and gas explorations. Meyer was a member of the Christian Brothers religious order in Napa Valley, serving as a teacher and coach. In 1964, the order asked him to work in its winery, starting as assistant cellar master under Brother Timothy. Once in that position, he was determined to become the best possible winemaker and administrator.

For the next 12 years, Meyer immersed himself in learning everything he could about operating a winery and distillery. He added bachelor's and master's degrees in viticulture and enology from the University of California at Davis to his initial degree in economics.

Justin Meyer

By the time he left the order in June 1972, Meyer had acquired extensive knowledge of winemaking plus 15 years of practical experience. In addition, he had a plan and a friend, Duncan who was living in Denver, CO, but owned 750 acres of Northern California pasture and orchards, including the former old Oakville Dairy, (450 acres on Oakville Crossroad), and 300 acres in three Alexander Valley parcels. At that time, only 20 acres in Alexander Valley were planted to grapes.

The two became partners and began planting their acreage to grapes. Following Meyer's plan, they started Silver Oak Cellars to make 100% Cabernet Sauvignon. The first grapes, approximately 15 tons from the Alexander Valley vineyards, were crushed in October 1972 and fermented at Christian Brothers.

The vineyards

In 1975, when Franciscan Vineyards went bankrupt, Duncan and Meyer bought the holdings. Four years later they sold both the Franciscan Winery and all their vineyards, except 20 acres in Oakville, which is now the location of Silver Oaks Cellars and Bonny's Vineyard, to the Eckes Company of West Germany.

Meyer stayed on as president/winemaker with Eckes after the sale of Franciscan for two more years and began construction of the Silver Oak facility in Oakville in 1981. Three years later, construction was completed in time for bottling of the 1979 vintage.

When they sold Franciscan estates, Meyer and Duncan took a 10-year grape contract on the Los Amigos Vineyard south of Geyserville in Alexander Valley and began looking for more acreage to buy.

They now own a total of 230 acres in four different Alexander Valley vineyards: 20 acres around what was Lyeth Winery, north of Geyserville; 50 acres at River's Edge, south of Geyserville; 100 acres called Miraval on Hwy 128; and 50 acres at Red Tail, which is on Chalk Hill Road.

"When we bought those properties, there were 40 acres of Chardonnay grapes which we sold to Clos du Val, Rombauer, and Raymond," recalls Meyer. "The vines were on AXR-1. We have now planted the land to Cabernet Sauvignon, using two different rootstocks. We still have 40 acres in the Red Tail vineyard on AXR-1 but have seen no sign of phylloxera, so we have no plans to remove it, unless it starts to look sick."

All the planted acreages are in Cabernet Sauvignon now, except for a small plot of Cabernet Franc at Miraval and a little Petit Verdot and Cabernet Franc in Napa Valley.

In 1996, the winery bought and crushed some Napa Valley Merlot as an experiment. Meyer plans to age the wine in barrels for 30 months, then decide what to do with it. If the Red Tail vineyard does have to be replanted, Meyer may experiment with Merlot, Cabernet Franc, and Petit Verdot there, since it is an exceptional hillside site. These varieties could be considered as blending components, or could be sold off in bulk. Currently, Silver Oak bulks out an estimated 30,000 gallons of wine annually.

"This experimentation doesn't mean that we plan to make any changes unless it will improve our wine," he quickly explains. "Our customers are happy with what we produce, and we don't want to change that."

Adding Lyeth Winery

Since Silver Oak owns so many acres in Alexander Valley, it seemed to make sense to have a winery nearby. "Hauling 400 to 500 tons of grapes to Oakville was not detrimental to the fruit," says Meyer. "But it made better sense to cut the haul time to 15 or 20 minutes. Besides, things were getting crowded at the Oakville winery.

"We had decided to build at Miraval and had set a piece of land aside as a site. We had our designs and had obtained all the permits to build when the Lyeth property became available. It offered twice as much space and was considerably less costly. It would be nice," he admits, "if this facility were set in the heart of the vineyard on Hwy 128, but the advantages far outweigh the disadvantages."

The Lyeth purchase in 1992 allowed the partners to add two barrel rooms (5,000 sq. ft. each next to the winery), so Silver Oak no longer has to lease barrel storage space. The new additions accommodate 4,500 barrels, all 55-gallon American oak.

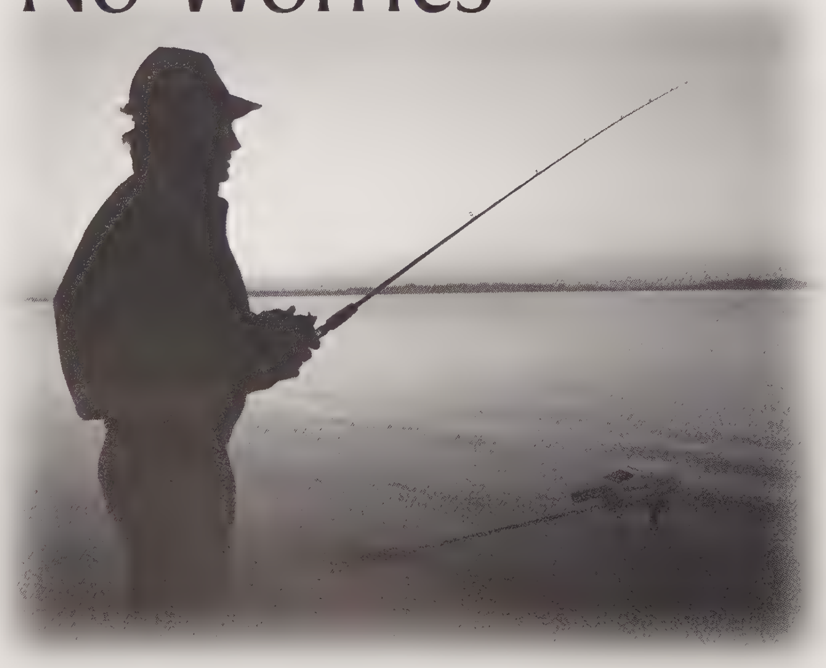
"I'm an American oak chauvinist pig," explains Meyer. "I tried French oak, but I like American oak better. There's none of the bitter after-taste you get with French oak, which is why we abandoned French oak originally. I think the vanillin is more evident in American oak."

"We purchase 1,500 new barrels each year from several coopers, but predominately one source, and sell 1,500 six-year-old barrels annually."

Financing Silver Oak

Duncan and Meyer started their venture debt-free. Whatever Meyer (the limiting partner) could afford to put up or put back into the winery, Duncan would match. As they built the five-year inventory, their whole approach was to put profits back into the winery. When they did borrow, the owners planned carefully.

Financing for the original vineyard



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plantings came from Connecticut Life Insurance Co. For financing purchases of additional land and purchase of Franciscan Vineyards (Oakville, CA) in 1975, they looked to Bank of America (BofA).

"We stayed with BofA until about the mid-1980s," recalls Meyer, "but we were beginning to feel that the formulas they used for evaluating worth were conservative. Even if Napa and Sonoma Cabernet Sauvignon was selling for $15 per gallon in bulk, they would come up with a statewide valuation of $7 per gallon by factoring in Central Valley grapes. Then they would limit borrowing to 60% of that.

"We told BofA, when it was time to renew, that their estimates were conservative. We looked around, and told them we were going to pay them off and go elsewhere. The good thing that came out of our experience for the whole industry was that BofA did a lot of studies and began making better, revised offers to other growers and wineries."

The partners bought Lyeth Winery (Alexander Valley) on their line of credit from Pacific Coast Farm Credit (PCFC), where they moved their financial affairs after leaving BofA. "My partner and I have great confidence in Farm Credit," Meyer remarks. "As I have said in the radio and TV ads Farm Credit asked me to do in 1996, one of the things we were most impressed by was the speed with which we consummated the deal for Lyeth, in 1992 when we only had 90 days to secure financing.

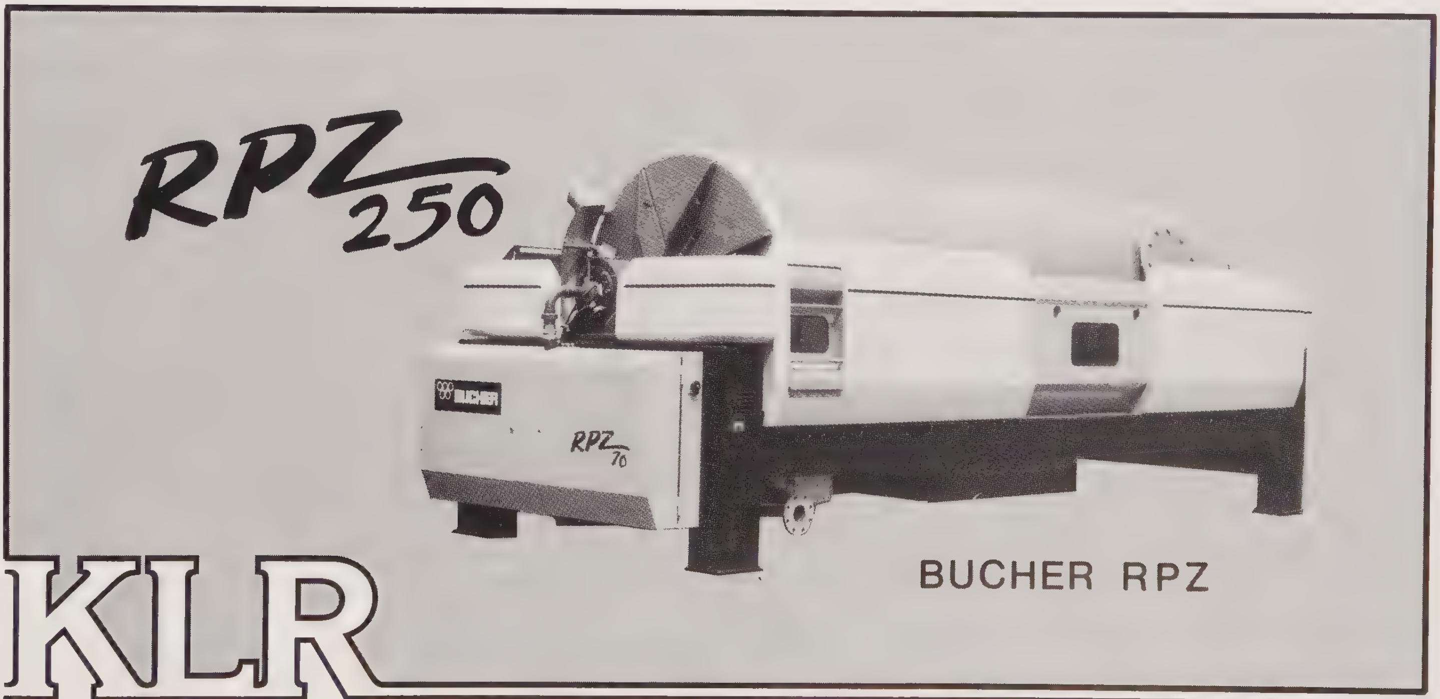
"We haven't always sought the lowest interest rates," Meyer explains. "But we'd sit down and make out the budget and figure what interest rate we could live with long-range. That way we always could see the cost of the money right up front, and we made sure the loan terms were in line with our plans.

"We set a break-even figure as well as an ultimate goal. Fortunately, we never just hit the break-even. We have always sold out of wine."

In dealing with Farm Credit, Silver Oak has had an ongoing inventory loan — a three-year line of credit up to a seven-figure sum that the partners felt would see them through any worst-case scenario. That scenario has never occurred, however. Every year by year-end, they have paid off their line-of-credit balance.

At PCFC, Jeff Kanter says Meyer's forecasts are very conservative and the Silver Oak partners understand that Farm Credit likes working with businesses that meet or exceed projections. One look at the historical record of Silver Oak's three- and five-year goals, (always achieved), gives both the winery principals and Farm Credit confidence in future plans.

"I don't think you can operate today without keeping your banker right in the middle of what you are doing," Meyer asserts. "Before buying the Lyeth facility in 1992, we planned it all out. That purchase, which came out of our line of credit, was re-negotiated into a long-term loan. That was very beneficial, because the interest rates were low."



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Growth

The first Silver Oak vintage (1972) produced 1,100 cases, which were filled and corked by hand in front of the Oakville dairy buildings in July 1975. (The 1975 Silver Oak crush was conducted at Franciscan Winery, where Meyer had taken over as president/winemaker.)

The 1974 vintage yielded 4,000 cases. Production tripled by 1978, and then held steady at around 12,000 until 1982 when it increased to 18,000 cases. Today, production has more than doubled to approximately 48,000, where the partners intend to maintain it.

"When we started out in Oakville," explains Meyer, "we planned to be a producer with no on-site sales. For that, we didn't need a use permit. Then, in 1987 when we expanded, we sensed the tightening of local permit controls, so we applied for a tasting room permit."

When the Geyserville tasting room opened at the former Lyeth facility in 1993, the plan was to sell only the Alexander Valley Cabernet Sauvignon at that site. However, Meyer's wife Bonny (who has handled sales and marketing for Silver Oak) suggested that making customers travel to Napa Valley to purchase a bottle of each wine at the source, would make a lot of people unhappy, so both wines are available at each location. About 8% of total sales occur in the two hospitality centers.

Tasting and sales policy

Silver Oak charges $5 for tasting, which entitles the guest to a choice of a complimentary wine glass or corkscrew. The vintage in current release is available for sampling and, visitors are offered barrel samples of two-year-old wines.

The Alexander Valley Cabernet Sauvignon is traditionally released August 1 (four years post-vintage); the Napa Valley, in February, five years post-vintage. There is no wine club connected with Silver Oak. "About as close as we come," says Meyer, "are mail announcements to our regular customers prior to release of the wines."

In 1992, the winery discontinued separate release of a Bonny's Vineyard designate. "While everyone loved the Bonny's Vineyard," Meyer explains, "there was an extremely limited quantity which sold out in two weeks. We decided we were making more people unhappy than happy, so we solved the problem by putting it into the Napa Valley blend."

Bonny designed a new label for the new blend, which was released in February, 1997 to mark the winery's 20th vintage. This release marks the first time there has been a price difference between the Alexander Valley and Napa Valley wines. The Napa blend in the new package sells for $45/bottle; Alexander Valley, in the traditional package, retails for $36/bottle.

When the 1992 Alexander Valley was released August 1996, visitors to the retail rooms were permitted to buy two cases. Demand was so great that the limit was soon reduced to one case, then to six bottles, and by Christmas, to one bottle per customer.

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Sales and marketing

When the first Silver Oak wine (1972) was released in 1977, Bonny went on the road and sold it to restaurants and retailers throughout California. More recently, Bonny has moved from sales to a position as marketing consultant, with responsibility for label design and beautification of the winery properties. Much of her time recently has been spent dealing with plans for the yearlong celebration of the winery's 25th anniversary, now in full swing.

David Cofran, who joined the company in 1984, has been promoted to general manager, overseeing a sales staff of four; three in California and one in Atlanta. Tim Duncan, Duncan's son, is national sales manager. Silver Oak wines are available in 50 states and 13 countries.

While Meyer admits the winery could sell all the wine it makes within the U.S., he has built an export market so that, if the U. S. market ever gets soft, Silver Oak will have an established presence overseas. Total foreign sales, through brokers and wholesalers, are nearly 2,000 cases. London is the biggest market, accounting for 120 cases annually. Other Silver Oak customers are the Scandinavian countries, Hong Kong, Singapore, and Switzerland.

State of Silver Oak today

From the beginning, Justin Meyer has considered himself more viticulturist than enologist and has called himself winegrower, but now he has a new title. Effective with the 1996 crush, Meyer became president/winemaster and Daniel Baron, a two-year member of the winemaking partnership was given the title winegrower.

"I called our employees, about 40 people, in and announced the changes," Meyer states. "I had been planning it for some time. Now the only person who reports directly to me is Dave Cofran. My goal is to provide more time for myself and to make sure everything runs smoothly when I am off premises.

The next generation

"People say to me, 'If you're selling everything you make, and you have more wine available, why not increase production. With more wine, you could make more customers happy.' I tell them I'm tired of building an estate for the kids. Now, I want to enjoy myself. It's time to have a little fun. Besides, I don't think the wine we're bulking is as good as the top end that we bottle. I don't think it would show the quality we want, and we are driven by quality, not quantity.

"We're where we want to be and I'm happy. Sure, we could expand production of the Alexander Valley Cabernet Sauvignon considerably, but I don't have any idea what the investment would be so I'll leave that for the kids."

When word of the internal changes Meyer instituted last year reached the public, Meyer and Duncan were besieged by lucrative offers to buy Silver Oak. To these, their reply was a terse, "It isn't our intent to sell."

Part of the restructuring, Meyer points out, was to protect the next generation from crippling inheritance taxes. So important is this to Meyer's mind, that he has traveled to Washington, D.C., with the Wine Institute to lobby for changes in the tax laws. To give the Duncan and Meyer progeny as much protection as possible, the winery now operates as two limited partnerships and a sub-chapter S Corporation.

Winemaking at Silver Oak

Though there's been a shift in management, Meyer expects the Silver Oak winemaking style to remain the same. "Our wine is not a big, tannic, artsy statement. We make it to be appealing. The good news to me is when the consumer says, 'Wow, that tastes great. Give me another glass.'

"Personally, I like the soft velvety character of the Alexander Valley — it is fruity, cherry-like. Napa Valley Cabernet Sauvignons are more austere and get better reviews from the press. My attitude is: 'Everybody's right!' What your palate tells you is good is what you should be drinking. Wine is very subjective, and we (in the industry) have done consumers a disservice by intimidating them." ■

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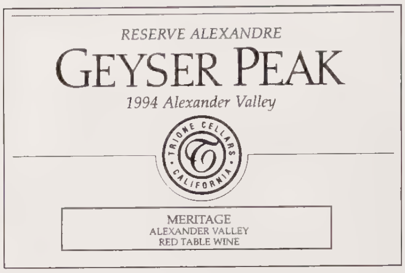
ALAN TENSCHER, winemaker
Franciscan Oakville Estate,
Rutherford, CA
Magnificat

DARYL GROOM, senior winemaker,
Mick Schroeter, winemaker
Geyser Peak, Geyserville, CA
Reserve Alexandre

STEVE HASSARD, winemaker
Hedges Cellars, Benton City, WA
Red Mountain Reserve

BOB LEVY, winemaker
Merryvale, St. Helena, CA
Profile

STACY CLARK, winemaker
Pine Ridge Winery, Napa, CA
Andrus Reserve



by Eleanor & Ray Heald

Without doubt, the U.S. wine industry perfected the art of varietally labeled wines. But, in the 1980s, Bordeaux red varietals saw unprecedented planting in California and Washington state. In the time-honored tradition of Bordeaux, vintners in those states began to bottle blends of five grape varietals Cabernet Sauvignon, Merlot, Cabernet Franc, Malbec, and Petit Verdot.

Many producers chose proprietary names for Bordeaux blends. Since 1989, others have traveled the Meritage labeling route. Whichever the choice, West Coast blends of red Bordelaise varietals have raised wine amalgams to new heights.

PWV asked several producers of Bordeaux varietal blends to discuss ideas from grape selection through cellar techniques used to create each winery's individual style.

Designing a style

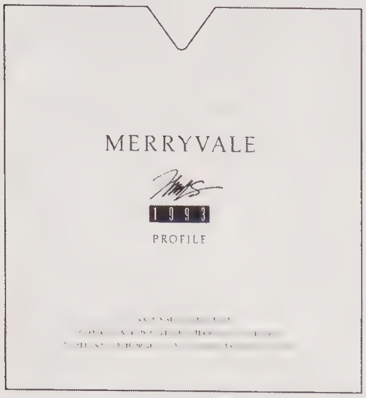
In the four years that **Beaulieu Vineyard** has released *Tapestry*, the blend has included only Cabernet Sauvignon, Merlot, and Cabernet Franc, mainly because the winery has not had a supply of Malbec or Petit Verdot. Some Malbec is included in the 1994 *Tapestry*, and Petit Verdot may enhance a future blend.

Cabernet Sauvignon dominates the amalgam; half of it comes from the Rutherford Bench area where Beaulieu Vineyard believes it grows its best Cabernet Sauvignon. The Rutherford Bench portion is the backbone. Merlot is added because it is an ideal companion to Cabernet Sauvignon, giving it a little more silkiness and tweaking its flavors.

Beaulieu Vineyard bottles three other Cabernet Sauvignons, and the desire is to make *Tapestry* distinct. Cabernet Franc, in a small percentage, adds more bright vibrant fruit and bumps up the fruit profile. It lacks the backbone of either Cabernet Sauvignon or Merlot sources.

"For *Tapestry*, we are not keeping to one vineyard or one subregion of Napa Valley, because in our other wines, such as Rutherford Cabernet Sauvignon and the Private Reserve, we're sticking to the Rutherford appellation or Rutherford Bench designation," winemaker Joel Aiken comments. "We have sufficient vineyard resources throughout the Napa Valley, so we don't want a set recipe for *Tapestry*. We pick and choose every year. Cabernet Sauvignon sourced from a vineyard on Spring Mountain distinguishes *Tapestry* from Napa and Rutherford Cabernets at Beaulieu Vineyard.

"The impetus is to make a reserve-style wine, distinctly different from



Andrus
Reserve
1994
Napa Valley
ESTATE BOTTLED RED TABLE WINE GROWN & PRODUCED BY PINE RIDGE WINERY NAPA, CA BW 5012 750ML

what has traditionally been over 95% Cabernet Sauvignon in Beaulieu Vineyard's other blends. We like the option of blending in the other Bordeaux varietals if it makes a better wine."

Magnificat produced by **Franciscan Oakville Estate** is a blend of Cabernet Sauvignon, Merlot, and Cabernet Franc. Cabernet Sauvignon is the principal variety at about 60% of the blend. Malbec and Petit Verdot were planted in 1996 as potential additions for the blend.

According to winemaker Alan Tenscher, the goal is to create a sophisticated red wine — reflecting the fruit aromas and flavors of the appellation — that is supple with necessary tannins for depth as well as longevity. In contrast, Franciscan's Oakville Cabernet Sauvignon is more intensely fruit flavored with obvious varietal character and less of the heightened aromas of *Magnificat*.

While Cabernet Sauvignon and Merlot are dominant in the blend, **Geyser Peak** is committed to using all five Bordeaux varietals for *Reserve Alexandre*. On average, Cabernet Sauvignon is 40% of the blend, but this can vary by as much as 10% in any given year.

Styling the Reserve Cabernet Sauvignon and *Reserve Alexandre* differently is crucial to the winery's red wine program. "In fruit selection, the Reserve Cabernet Sauvignon tends to be the bigger, richer style," winemaker Mick Schroeter says. "We're looking for more sweet fruit characters in *Reserve Alexandre*."

Red Mountain Reserve is 2% of the production at **Hedges Cellars**. All fruit is Red Mountain designation from Columbia Valley, WA. Vineyard parcels have southwest slopes, about 5% to 6% grade with sandy, decomposed volcanic ash soils.

In any year, there are no preconceived notions about which varieties will compose the blend. *Red Mountain Reserve* is designed to be the best red wine in a given vintage, regardless of varietal content. "Theoretically, it may be a blend of Cabernet Sauvignon and Merlot only," winemaker Steve Hassard maintains.

Merryvale also designs it's *Profile* to be the best red wine of the vintage. It isn't necessarily composed of all five Bordeaux varietals, any one may dominate the others. The focus is to blend multiple vineyards rather than a single one. In any year, one location in the vineyard will exceed other spots and/or one variety will exceed the others.

"Having a Meritage-style wine offers maximum flexibility without being tied to preconceived notions about best vineyards or blocks," winemaker Bob Levy notes.

Grapes for *Andrus Reserve* come from a 25-acre vineyard off Zinfandel Lane in Rutherford surrounding the home of **Pine Ridge Winery** owners Gary and Nancy Andrus. Winemaker Stacy Clark says that the winery has a commitment to using all five Bordeaux varietals in the blend, and has planted them to obtain the complexity and layers of flavors and aromas each variety contributes.

The *Andrus Reserve* is bottled only from exceptional years. The first release was 1978 and has been followed by releases of 1980, 1985, 1986, 1990, 1991, and 1994.

Grape maturity decisions

Cabernet Sauvignon for *Tapestry* comes from Beaulieu's better vineyards, avoiding the center of the valley near the Napa River where yields are higher. Half of the blend is from Rutherford Bench sites yielding approximately 5 tons/acre (TPA) for older plantings, and the newer Spring Mountain vineyards, the other source, yield 3 to 5 TPA.

Field sampling sets some sugar parameters, but ripe flavors are the goal, regardless of sugars. "If going to 24° or 24.5° Brix gives better flavor and tannin resolution, we do that," Aiken says. "It is the same with Merlot and Cabernet Franc. As we are getting more fruit from newly replanted, healthy vineyards, we're seeing that, at 23° Brix, we're not getting mature flavors like we might have in a vineyard with leaf roll virus that would struggle to get to 23° Brix.

"The best scenario occurs when hang time achieves perfect balance below 25° Brix. Some of the newer vineyards are so healthy, that we're having to slow down their ripening to get mature flavors."

Bob Masyczek, Beaulieu Vineyard assistant winemaker, doesn't like to discuss TPA as a measure of anything. He believes the fruit to pruning weight ratio is more important and wants this ratio to be 2:7. "If it is, we're comfortable with a heavier crop load," he contends. "This is the key to proper fruit maturation characters."

Cabernet Sauvignon vines for Franciscan's *Magnificat* average 15 years. Major replanting is ongoing for the vineyard portion on AXR-1 rootstock. Merlot and Cabernet Franc have been replanted where necessary. Their vine age averages eight to 10 years. Crop levels in loamy soil are 5 to 5.5 TPA. Leaf removal and crop thinning are regular practices on seven-wire vertical trellising. Parameters for harvest are non-herbaceous fruit flavors and ripe tannins.

When compared to the Reserve Cabernet fruit picked at 24° to 24.5° Brix, Cabernet Sauvignon for Geyser Peak *Reserve Alexandre* is harvested earlier at 23.5° Brix. "But this depends largely on the year," Schroeter admits.

Merlot and Malbec add some softness, balance, and roundness to the wine. Cabernet Sauvignon and Merlot, all from Alexander Valley, have yields around 4 TPA. Winery-owned vineyards are the sole source for Malbec and Petit Verdot. Malbec has trouble setting, and in one year, it may be 2 TPA and another 4 TPA. Either way, the fruit is soft and elegant, round and fleshy with good texture.

Petit Verdot acts as a balancing variety and has been as high as 20% of the Geyser Peak blend and as low as 5%. It has inky-black color and not a lot of fruit character, but its nice tannin structure provides a structural block in the blend. It's typically harvested early and reaches a level of ripeness around 22.5° Brix, then doesn't go higher.

Cabernet Franc is a barrel selection from one vineyard source and typically 5% to 10% of the blend. While some winemakers say that Cabernet Franc has fantastic tannin structure and building block effect, Schroeter doesn't see that from this vineyard. It just lends another fruit character dimension.

Hedges harvests Merlot in the first week of September and finishes up with Cabernet Sauvignon in the first week of October. For ripeness, the focus is on flavor maturity as well as sugar, but Hassard is only willing to go to 24° or 24.5° Brix because above that the alcohol level gets too high. Own-rooted vines crop at 4.5 to 5.5 TPA. Cabernet Franc — 1% to 2% of the blend — is an incidental component which comes from topping wine. "The Cabernet Franc vineyard block is too young and is not yet up to quality on Red Mountain," Hassard says.

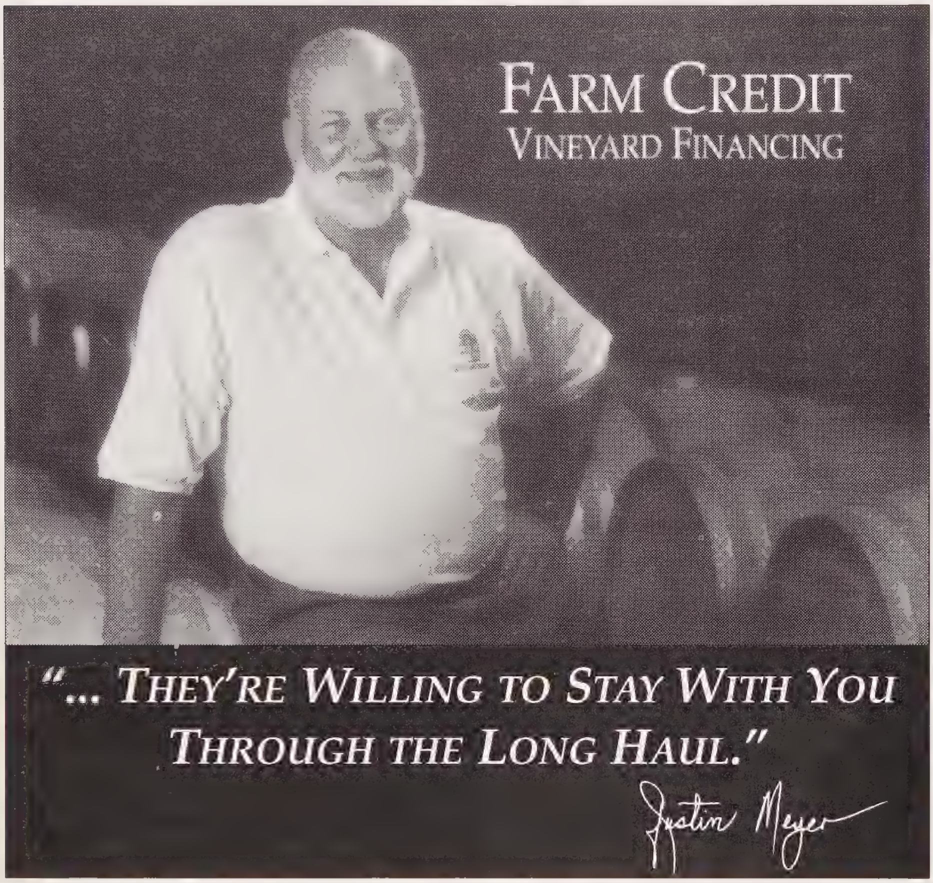
For all varietals, Merryvale vineyard sources are hillside. Levy believes that with good viticultural practices, sugar and flavor maturity can be achieved independent of TPA. "These are already in place by site location," he stresses. "Tannin maturity is the most difficult. In a warmer climate like the Napa Valley, we can have sugar maturity before tannin maturity. To overcome this, you have to accept the fact that in some years you'll have high sugars when tannin maturity is achieved. But if the yield is too high, tannin maturity will not be achieved.

"Cabernet Franc must be at 2 to 2.5 TPA to have a fleshy mid-palate and mature tannins. Cabernet Sauvignon and Merlot range from high 2 to as high as 4 TPA. In a cooler year, you can get away with higher tonnage, but not in a hot year with early harvest."

The home estate vineyard used for *Andrus Reserve* is at the base of an alluvial fan with nutrient-packed clay soils two feet above. Years ago, this was a nursery site, and decades of plants have contributed to the rich soils. Wine from 5.5 acres of Cabernet Sauvignon within the vineyard constitute 40% to 50% of the blend. Vines are cane pruned on a vertical double Guyot, 1,815 vines per acre, and yield 4 TPA. Other varietals, similarly trained and pruned, have comparable low yields.

Assessing the parts

"Each varietal brings something to the party," Tenscher contends. For *Magnificat*, Cabernet Sauvignon is the main source of fruit and berry aromas.



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Malbec brings clove spice and some earth, says Schroeter. Petit Verdot is more of a structural component and can add some violet scents.

Cabernet Franc adds green olive, leafy, and spice and enhances the texture of *Andrus Reserve*, notes Clark.

With all Bordelaise varietals, Levy tends to be put off by any green components. In aromatic differentiation between Cabernet Sauvignon, Merlot, and Cabernet Franc, he looks for similar elements in all three — concentration, power, and berry character. "It may have been said that Cabernet Franc elevates aromatics, but I think any wine can if it has high quality, not necessarily Cabernet Franc," Levy notes.

Henderson looks at the best blend as the sum being so much greater than the individual parts. Some over-oaked Merlot may be terrible on its own, but if the main blend is lacking some oak, this Merlot may work well. At Hedges, the better Merlot lots tend to be the preferred component in the blend, but this is not always the case.

Aiken agrees. "The majority of our blend is typically Cabernet Sauvignon. If I had the perfect Merlot to bottle on its own, it would be nice, but not overly distinctive. I look for Merlot to have a nice, spicy, herbal character to add at 15% to 20% to make a better blend. But that Merlot on its own might be too herbal to be a separate bottling.

"When Malbec and Petit Verdot are assessed on their own, I want them at less than 5% of the blend. I view Merlot this way also, although at a larger percentage. Our style requires Cabernet Sauvignon in the majority."

Masyczek cites the two most important elements as compatibility and synergy. "You never know how an attractive element on its own is going to work in a blend until you do a blind tasting," he stresses. "You can try to guess what's going to perform well in a blend, but the true quality is borne out and compatibility comes into play in a blind tasting. Herbal characters may combine in a manner that you might not have considered, but add interest to the blend."

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Levy has a different technique. Initially, he looks for the wines that are the standouts on their own. Typically, he says, it's the combination of superior lots that makes the best blend. There are some exceptions, but for Levy, top lots are the starting point to building the best blend.

Winemakers agree that blending is not complete in three or four days, but requires several months with several revisits. Perhaps after six or seven blending sessions, the final blend is established.

Creating the whole

Winemakers have differing philosophies on assembling the blend to create a whole greater than the sum of its parts. Through the growing season, Beaulieu assesses the overall quality of the vintage. If it's a "big" year for Cabernet Sauvignon with significant tannins and bigger body, greater percentages of Merlot than Cabernet Franc are desired.

"We keep about 80 lots of the three varietals separate out of the fermenter and into barrels," Aiken explains. "We refine vintage gauges during the barrel ageing period and plan the blend throughout time in barrel. We call this responding to the vintage, rather than specific vineyards. We want the flexibility to choose from what we have in the cellar."

Levy approaches the blend from the view of vineyard selection, not sourcing. In selection, he not only refers to lots of wine, but to winemaking matching selection made in the vineyard. In some years, a vineyard parcel may ripen evenly, and it can be picked all at once. If it's not, picking is done by rows or parts of rows that are mature followed by passes later to pick the rest.

"If, with the later picking, we're not as successful with tannin maturity, then the winemaking will be different," Levy illustrates. "Lots are kept separate. If the same wine goes into different barrels, these become separate lots and are reviewed as blending potentials. When it comes to making the blend, all options are tasted blind, and selection of best lots is determined for further blending trials to make the superior wine."

Aiken notes that both Beaulieu and Merryvale have the luxury of a number of lots and therefore a bigger pool from which to choose. This is different from Pine Ridge, which is a single vineyard source with wine bottled only in exceptional years.

"Geyser Peak has constructed a new red cellar, with 10- and 20-ton fermenters to handle a significant number of lots," Schroeter remarks. "The first element of selection is day three or day four in the life of a fermentation. Through experience and determination of our style, we might say this tastes like a *Reserve Alexandre* lot. If so, it goes to French oak after primary fermentation. Richer Cabernet Sauvignon will go toward American oak. We do a selection of Cabernet Franc and Merlot similarly.

"Crucial time is January when we do our 'classification.' We taste all barrel lots, independent of whether the Cabernet Sauvignon has gone into French oak or American oak. By and large, the ones that were selected earlier for *Reserve Alexandre* fit the mold stylistically. This may result in more Cabernet Sauvignon or Merlot than needed, but we've isolated all the potential reserve components to give us a wine that's classy, elegant, and balanced. In a 'big' year, we'll blend less Cabernet Sauvignon because we're shooting for greater elegance stylistically."

When grapes come in at Hedges, each lot has the potential to become part of the *Red Mountain* blend. "Truthfully, the same vineyards and blocks make it year after year," Hassard admits. "After fermentation, we give a closer look and decide best lots. If tracked toward the reserve program, wine goes into about 30% new oak. To make 1,000 cases of reserve, we set out about 2,400 cases of potential components. After one year, only the best lots remain in the reserve program, and the major percentage of the blend is finalized.

"We look for quality and complexity of flavors without one dominating. We want some oak uptake, but not too much. At that decision point, we take out the declassified reserves and prepare the blend we call The Three Vineyards, a mid-range red wine. Previously, that wine went back into our basic blend, but we decided it was too good, and we bottled it on its own. The *Red Mountain* blend is barreled for another year before bottling."

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for *Andrus Reserve*. Each varietal is kept separate, but the percentages vary from one vintage to another with Cabernet Sauvignon and Merlot dominating.

Winemaking

At Beaulieu, the majority of lots have seven to nine days of skin contact. A few lots get a 25 to 30-day maceration before pressing. Half the lots go to new to three-year-old French oak barrels pre-malolactic fermentation (MLF). After a 22-month barrel ageing regime, a blend is made. Before bottling, the wine is occasionally fined, but routinely sterile filtered.

Uninoculated fermentations have been attempted at Franciscan. They have been successful, but have only a subtle impact after barrel ageing. Wines are pressed after approximately 20 days of skin contact. This is followed by inoculation with ML culture. Wine is blended and goes to barrel post-MLF in half new French oak for 24 months. Filtration is not done if wine is clear and stable.

As it is for all red wine varietals at Geyser Peak, a six-day skin contact for the *Reserve Alexandre* components is typical. At 4° Brix, inoculation with an ML culture is done. After a first racking, wine is barreled in new to two-year-old French oak for 15 to 18 months. It is DE filtered before bottling.

At Hedges, *Red Mountain Reserve* components are pressed in seven to 14 days. An ML culture is added. After a third racking, wine goes to new and one-year-old French oak for a total of two years. The blend is made after a year in barrel and is barrel-aged for one more year. Before bottling, wine is DE filtered and then runs through a 2μ filter on the bottling line.

Grapes at Merryvale are destemmed, but not crushed. Berries are only broken open. "They are whole in many winemaker's terminology, but each berry has a tear and juice is running out," Levy notes. "I'm backing off uninoculated fermentations. I prefer to inoculate primary fermentation with Fermivin on day two for control and for flavors. With control, I get MLF to go after primary completes. I don't get higher VAs as I did with uninoculated tanks. I am leaning away from uninoculated primary fermentation, but MLF is routinely uninoculated."

For *Profile* components, skin contact time varies between 20 and 47 days. Wine goes to barrel one day post-pressing. The barrel mix is new and one-fill Nevers and Allier French oak. The blend is made just prior to the next harvest, but total time in barrel is 16 to 30 months. It is bottled unfiltered.

Andrus Reserve wine components undergo extended maceration for periods of 18 to 32 days. They are pressed to barrel for MLF. The wines are aged in 100% new, heavily-toasted French oak for 15 months. The aim is to bottle without filtration. ■

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CROSS-GENDER issues in a cross-cultural workplace

by Trula M. LaCalle, Ph.D.

Companies can spend thousands of dollars on cultural diversity training and sexual harassment training with disappointing results if the two trainings aren't integrated. In an intercultural work environment, male/female relationships are complicated by differences in culturally dictated gender roles. In the wine industry, with its many male Hispanic workers, the nature of the working relationship between these men and female supervisors and co- workers must be addressed and not overlooked.

Gender roles

Gender roles in the U.S. are strikingly different than in most Central and South American countries. Generally speaking, immigrant and U.S. born male Hispanics are accustomed to being dominant in their relationships with females. If a man has immigrated within the last ten years or after the age of 20, he is more likely to adhere to the cross-gender norms of his Hispanic culture. Keep in mind that, while Hispanic cultures have begun to incorporate the "women's movement" into their urban lives, the rural areas have remained relatively untouched by this social movement.

The degree of assimilation into U.S. culture is what determines any immigrant's ability to conform to our cultural norms.

Even in the U.S., the culture has changed dramatically within the last 30 years with regard to how men and women perceive women's roles — both domestically and occupationally. In the U.S. workplace, male dominance has been challenged by labor laws which protect the equal rights of women. American men have had to make adjustments to these changes; so consider how much more difficult it is for men with contrasting cultural heritages to adapt to U.S. gender role expectations.

When women are put in a supervisory position over Hispanic men or when women have a higher status than the Hispanic men in a company, some Hispanic men feel uneasy with the women's authority. If his female supervisor behaves in a domineering fashion toward him, the Hispanic male will almost certainly react negatively. He may or may not challenge her directly, but he is highly likely to challenge her authority indirectly. He may solicit support from male co-workers by labeling her domineering manner, using words such as "bossy" or "bitchy" or, in Spanish, words such as *"mandona"* (bossy) or *"hombruna"* (mannish, butch) or other sexually derogatory names. And, very commonly, he may sabotage her authority in covert subtle ways.

Female authority

Women supervisors and business owners in the wine industry have been successful with male Hispanic employees by being sensitive to the need for the Hispanic men to "save face" and not allow themselves to be "pushed around" by a woman. A female supervisor must quickly learn to ask the Hispanic male worker to do his job in a way that meets company standards, rather than tell him — or order him — to do it *her* way. By making her instructions clear, unequivocal, and consistent, she gets her message across without having to remind him of her authority; she knows that he is very sensitive to their difference in status, and she should be careful not to make an issue of it.

Successful female managers of Hispanic immigrant males have relied on traditional styles of Latin American management to assure their respected positions with employees. The traditional style dictates that the boss be knowledgeable and benevolent but direct, earning the loyalty of good employees.

The Latin American style is more personal and less detached. Thus, in the Hispanic tradition, supervisors would assist Hispanic immigrant employees who need help with learning English, applying for citizenship, finding bilingual medical care, understanding traffic regulations, finding housing for their families, and so on. This nurturing role may make some female non-Hispanic supervisors bristle because they deem it to be the traditional female role which women in the U.S. have worked so hard to transcend. Or, they may view this seemingly non-work-related assistance as "not my job." However, some successful Napa and Sonoma County female grapegrowers and vineyard managers attribute their success in earning employees' trust and respect to their willingness to support their employees in many ways such as these.

Friendly relations

Women in the wine industry say they need to understand how to get along well with immigrant male Hispanic employees. I've spoken with non-Hispanic women in supervisory positions who feel uncomfortable with the lack of eye contact and interaction between themselves and the Hispanic male workers. Others wonder why the Hispanic men keep to themselves at company social gatherings. These women feel they have tried to be friendly and approachable, but to no avail. What they fail to realize is that, by leaving the supervisory women alone, the traditional Hispanic male is showing respect. If non-Hispanic women try too hard to "break the ice," their behavior can be misinterpreted as a flirtation — especially if the women are single.

Sexual harassment

Romantic relationships can develop between male employees and female co-workers. For employers, the possibility of sexual harassment arising out of male-female interactions is of concern. Of course, sexual harassment can go both ways — male or female, Hispanic or non-Hispanic, can be a victim or perpetrator.

On the job, Hispanic males are less likely to sexually harass women because they are hoping for sexual favors than to

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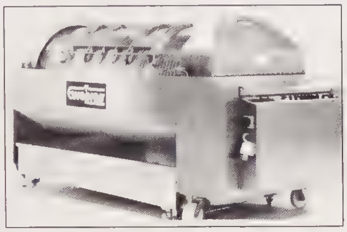

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harass for the purpose of wielding male power. Men who harass, both Hispanic and non-Hispanic, most often use sexual harassment as a means of exercising male dominance and re-establishing what they consider to be the "natural order" of male/female relations.

When Hispanic male employees and their female counterparts work side by side, they may work the same number of hours for the same salary and status. They may be asked to work as equal members of a cooperative team. Some Hispanic men feel this situation robs them of their cultural privilege of superiority over women. Frustrated with this cultural accommodation, some Hispanic men strive to keep the women "in their place" through the use of vulgar language and sexual innuendoes. Because they refrain from making physical sexual advances toward the women, these men may not recognize their verbal behavior as sexual harassment. And if they make sexual advances toward their female coworkers after hours, they may not recognize this behavior as sexual harassment which carries over to the workplace.

A learning environment

Some women in winemaking and grapegrowing have given up attempts to develop working relationships with immigrant Hispanic men. They avoid discomfort by delegating verbal communication to their male partners or assistants — a wife asks her husband to "speak to the men," a female manager relies on her immediate subordinate to hand out her orders. While this method may be expedient — or even necessary — at times, women in the workplace can learn to relate to Hispanic male employees in ways which are productive, pleasant, and successful.

Additional training can help many Hispanic men fully understand the U.S. cultural roles they must assume in order to work cooperatively and comfortably with their female co-workers and supervisors. ■

Trula M. LaCalle, Ph.D. is a human relations and management consultant living in Sonoma County. Spanish is her second language. She is married to an Hispanic and has 25 years experience working with Hispanics from various Latin American countries. Her background in psychology lends unique insights to her training presentations and consultations. She can be reached at 707/577-9367 or lacalle@metro.net.

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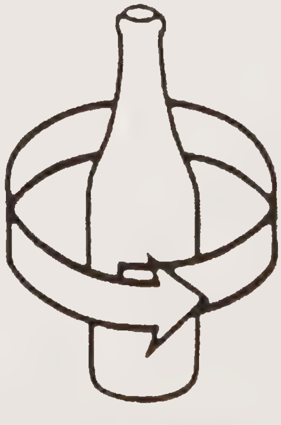

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GROW TUBE EXPERIENCES

Seven growers Share Secrets for Success

Ron Metzler expects to harvest about five tons per acre from second leaf Chardonnay vines. Ric Fuller and Herman Schwartz have converted 500 acres without missing a crop. Stasi Seay will pick three tons an acre from third leaf vines, triple the "normal" anticipated yield. Mike Gatzman predicts that his new vineyard will produce one year earlier than usual.

After one growing season, Brian Gephardt believes his new planting has the equivalent of two years worth of root growth. Ross Hodgkinson saved 25% on water and still achieved two years growth in the first year. John Borelli eliminated hand cultivation, dramatically reducing weed control costs.

What do these growers have in common? Grow tubes.

These seven growers share their grow tube experiences below and suggest management practices to achieve optimal results.

RON METZLER

Metzler Farms, Fresno, CA

Climate: Region V

Goal:

Ron Metzler developed 20 acres in 1996 with the goals all growers share: optimize production, minimize inputs of time and labor. While these goals are common ones, the methods Metzler used to achieve them are anything but common.

Project:

Two innovative practices, the use of grow tubes and a minimal pruning trellis system, make Metzler's development unique.

Metzler planted dormant bench grafts of Chardonnay in March, 1996, spaced 10x6. He installed grow tubes shortly thereafter because, "We wanted to move our vines to their maximum growth," explains Metzler.

In a minimal pruning system, canes cascade untrained from the cordon, creating what Metzler calls a "weeping" effect. An unusually high, 70-inch fruiting wire makes this system work. "We want to establish the fruiting zone as high as we can," says Metzler.

As vines emerged from grow tubes Metzler trained them up a seven-foot bamboo stake. When vines exceeded seven feet in height, he trained them out on the wire.

Grow tube choice

Metzler chose a 30-inch tall, twin-walled, 3.5-inch diameter, pink grow tube, with a side-opening slit.

Results

Vines reached the 70-inch fruiting wire in June and, essentially, filled the wire by August. They will produce a commercial crop in 1997. Metzler expects to harvest around five tons per acre in 1997 from the second leaf vines — and that's with conservative management. "The vines could produce more, but I don't want to stress them," he says.

"I get the value back in growth, and to get uniformity in the vineyard, grow tubes are essential. From the standpoint of training, they are highly beneficial to me."

Metzler used the same grow tubes and minimal pruning for another 200-acre planting in spring 1997. Always innovative, Metzler found another way to optimize the yield/cost ratio of this new development. Vines with grow tubes fill the wire so rapidly, Metzler decided he could plant 100 fewer vines per acre and use 10X7 spacing. At an average cost of $5 to $7 per vine, including planting stock, stake, and planting costs, that's a savings of $500 to $700 per acre. This savings more than pays for the grow tubes, so the benefits grow tubes provide immediately add to the bottom line.

Growth tube benefits at Metzler Farms

1. Accelerated, balanced growth (increased shoot elongation and trunk diameter), leading to a five to six-ton second-leaf harvest.
2. Reduced training costs.
3. Protection from herbicides.
4. Shelter from rabbits.
5. Ability to fill the wire quickly with fewer vines per acre.

STASI SEAY

Rancho Dos Amigos, Shandon, CA

Climate: Region IV

Goal

After first using grow tubes in 1994 strictly to protect inter-planted vines from rabbits, Stasi Seay adopted grow tubes to plant 20 acres in June 1995 to achieve faster growth in a new vineyard. More specifically, she wanted to increase first harvest yield and shorten the "ramp-up" time to full production of Merlot vines, spaced 10x6.

Project

For a few nervous weeks, Seay thought she had made a big mistake because planting day (June 11) was followed by the hottest week of the summer, seven straight days of 111°F. One day even reached 116°F. "We thought we would burn up the dormant bench grafts," she recalls. But, "We kept giving them water (through a drip system), and they were as happy as clams."

Seay's vines grew quickly — so quickly, in fact, that they were ready to be trained out before stakes and wire were in place. "We have always staked in the second year. This block needed to be staked after the first growing season." This is a good problem to have, because it means vines are ahead of schedule on their way to production, but it did create some financing headaches at the time. Seay encourages grow tube users to budget earlier installation of vineyard infrastructure into their financing arrangements.

After some juggling of the budget, stakes were installed after the growing season, and the grow tubes were removed.

Always looking to increase efficiency, Seay wondered if the growtubes would protect new vines from French plow cultivators. Normally these plows can only be used in older vineyards and new vineyards require more labor intensive means of cultivation.

Seay runs French plows with both manual and automatic trip-arm controls. To her surprise, she found that grow tubes protected new vines from both types. Protection from cultivators, like protection from mechanical harvesters, requires a rigid, sturdy grow tube.

The 1996 season brought continued impressive growth. Seay clipped about one-half ton of Merlot grapes per acre. Fruit production in second leaf reassured her that the rapid shoot growth of 1995 did not come at the expense of healthy root development.

Seay planted another 20-acre block in 1996, also using grow tubes. This planting was also followed by extremely hot weather, and again the vines survived.

Grow tube choice

Seay used twin-walled, pink, solid (not side-slit) 32-inch grow tubes on the 1995 block. These tubes ranged in diameter from 3.5 to 4.5 inches. For the 1996 block, she switched to 30-inch tall, 3.5-inch diameter, twin-walled, pink, side-slit grow tubes.

Seay's original harvest projection was for the 1995 block to yield one ton per acre in 1997, it's third leaf. However, based on the growth so far, she now predicts, "I don't have any doubt that this block will give us three tons per acre, with no problem at all."

Seay also feels the larger-than-expected harvest will determine the fruit-set pattern into the future, accelerating the timetable for "ramping-up" to full production.

Progress of the block planted in 1996 is "a mirror" of the 1995 block, and Seay is confident it will produce another large third leaf crop in two years.

Grow tube benefits at Rancho Dos Amigos

1. Accelerated, balanced growth rate, leading to a first harvest that will be three times larger than expected.
2. Protection from herbicides.
3. Shelter from rabbits.
4. Next-to-zero mortality, even during post-planting hot spells. Protection from French plow cultivators.

RIC FULLER AND HERMAN SCHWARTZ

Continental Vineyards
Paso Robles, CA
Climate: Region II

Goal

Ric Fuller and Herman Schwartz faced a challenge many growers share: how to convert an old vineyard without losing a harvest. "In today's marketplace, it's very important that we stay in production, especially with the premium varieties we grow and when grape prices today are so high," says Fuller.

Project

Before attempting to convert an entire 23-year-old, 500-acre vineyard, Fuller and Schwartz decided to start with 175 acres in 1996. Their conversion system has ten steps:

1. Retrofit the vineyard with a drip irrigation system.
2. Keep the overhead sprinkler system for frost protection.
3. Plant only superior dormant bench grafts or rootings half-way between old vines spaced 12x7 in January and February. The roots were not trimmed.
4. Use a customized hydraulic auger to plant vines. Each new vine gets a 12-inch diameter, 30-inch deep planting hole. Augering disturbs the soil to allow better rooting. It also severs the roots of the old vines, reducing competition new vines might face.
5. Mound soil to completely cover the dormant plant.
6. After shoots emerge from the mound, knock down the mound and install the grow tube. The grow tube is fastened to a 3-mm pencil rod stake.
7. Open the canopy of the old vine to give the new vine more sunlight.
8. Machine harvest grapes from the old vines with new vines and grow tubes in place.
9. Remove the grow tubes before winter and store them for re-use.
10. Train new vines to the 3mm pencil rod in autumn.

The next step is integrating new vines into the quadrilateral trellis system, spaced 12x7. In 1997, the old vines were cut back to a bilateral configuration, and new vines were trained bilaterally on the abandoned wire. When the new vines come into production, the old vines will be removed. There will be a dip in production, but none of the dreaded zero-harvest years.

Once new vines have been trained bilaterally, Fuller will choose one of two options. One option would be to take a spur off the 1996 vines and train it over to the other wire. The second option would be to plant new vines where the old vines were — doubling the density of the vines — and training the new vines bilaterally on the abandoned wire.

Grow tube choice

Fuller and Schwartz used a 36-inch tall, 3.5-inch diameter twin-walled, pink, side-slit grow tube on Cabernet Sauvignon, Merlot, and Chardonnay vines.

Results

"We did 175 acres in 1996, and we're very pleased with what we've done," says Fuller. Vine growth has far exceeded what Fuller would normally expect from inter-planted vines. "If we install grow tubes early enough, the leaves reach into the canopy of the old vine by mid-season," says Fuller.

Continental Vineyards also found that grow tubes promote uniformity in growth rate, reducing the labor needed to train new vines.

After some experimentation, Fuller and Schwartz discovered that grow tubes effectively protect new vines from mechanical harvesters. The ability to harvest mechanically over tender inter-planted vines saved dramatically on harvesting costs. The grow tube must have a rigid, sturdy design to provide this protection.

Despite the success of the project, Fuller and Schwartz are always testing to find even better techniques. They compared the cost and performance of dormant bench grafts versus field-budded vines in spring 1997 on 170 acres. Grow tubes will be an integral part of the system.

Grow tube benefits at Continental Vineyards

1. Accelerated, balanced growth.
2. Allocation of growth (channeled upward into old canopy).
3. Allocation of growth (upward growth as opposed to "bushy" growth).
4. Protection from herbicides.
5. Ability to mechanically harvest over new vines.
6. Reduced training costs.

BRIAN GEPHART

Vineyard Manager
Wild Oak Vineyard for St. Francis Winery
Santa Rosa, CA
Climate: Region II

Goal

When Brian Gephart establishes a new vineyard, he measures successful establishment in terms of root system development. His goal is always to establish vigorous root systems to poise the vineyard for healthy, long-term production.

Project

Gephart planted 45 acres of Merlot and 10 acres of Cabernet Sauvignon in March and April 1996 with dormant bench grafts spaced 9x6. Twin-walled, 36-inch tall, 3.5-inch diameter pink grow tubes with a side-opening slit were installed at bud push.

Because the cordon wire was not yet in place when vines emerged from the grow tubes in mid-summer, they were tied to the stake and topped twice at 40 inches above ground.

After the growing season, grow tubes were removed and stored in "mini-bulk" fertilizer bags for transport to new vineyard developments. In 1997, Gephart's crews trained the shoots to the stake with tie-tape and topped them to form a bilateral cordon at 40 inches above ground.

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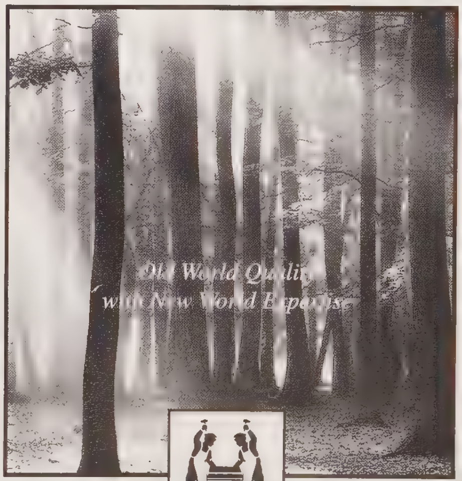

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Results

When assessing growth and reduced vineyard management costs, "I couldn't be happier with the results," says Gephart.

He evaluates growth by measuring root development, not shoot growth. He measures root development with aid of a neutron probe, which monitors moisture levels at various depths. If the moisture level at three feet is considerably less than at 2.5 feet, Gephart knows the vines have roots to a depth of at least 2.5 feet.

His vines rooted to a depth of 2.5 to three feet after the first year. With this level of root development, Gephart believes these vines will triple in stem diameter and completely fill the wire (40 inches above ground) in second leaf, far ahead of his expectations.

Grow tubes also produced substantial savings on vine training. "My crew only had to go through the field once or twice all season," says Gephart, "mostly just to tie off and top vines emerging from the tubes. I probably got the cost of the tubes back in reduced training costs."

Gephart was also impressed with the uniformity of growth rate, which makes every aspect of vineyard establishment easier. "What price tag can you put on consistency of growth? The soil isn't consistent and even the best-installed irrigation system isn't totally consistent. But you would never have known it by looking at these vines. They were virtually all the same size."

The early growth meant end posts and wire had to be installed in May 1997, sooner than expected — and therefore sooner than was budgeted. Gephardt feels such budgetary headaches are far outweighed by the advantage of rapid establishment of the vines. He plans to incorporate faster growth into future budget projections.

"Grow tube reusability is also a real advantage," says Gephardt. "Every time I reuse the tubes, the cost comes down." He is reusing grow tubes on two new developments in 1997 and purchased more tubes to use on another block. "I'm going to use grow tubes in all my applications — dormant vines and green vines. Sometimes I'll install them over newly-planted vines, and in other cases I'll use them on second-leaf vines, depending on my needs."

Grow tube benefits at Wild Oak Vineyard

1. Accelerated root system establishment.
2. Reduced training costs (savings in training probably paid for the grow tubes).
3. Protection from deer.
4. Uniformity of growth rate.

ROSS HODGKINSON

Bellerose Vineyards, Healdsburg, CA
Climate: Region II

Goal

When Ross Hodgkinson first used grow tubes on a large scale in 1995, he was faced with planting a vineyard on a rocky hillside with limited water. To make matters even dicier, the vines were going in before a deer fence could be constructed. He looked to grow tubes primarily for water conservation and predator protection.

Project

The Bellerose Vineyard (Nuns Canyon block) development in 1995 included blocks of Cabernet Sauvignon, Syrah, Zinfandel, and Merlot. Dormant bench grafts were planted on 9x6, 8x12, and 8x8 spacing, depending on the variety between June 15 and July 20.

Grow tube used

Hodgkinson has experimented with a number of different grow tubes. He found some types seemed to cause heat damage or mortality, while oth-

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ers photodegraded quickly, making reuse impossible.

Hodgkinson now uses only twin-walled pink grow tubes. His use of these grow tubes has spanned several design improvements. In 1995, he used 36-inch long, 3.5-inch diameter, twin-walled, pink, solid (not side-slit) grow tubes, ranging in diameter from 3.5 to 4.5 inches. In 1996, he switched to a side-slit model, with clips to fasten the overlapping edges of the slit. This design gave him the ability to sucker the young vines.

In 1997, Hodgkinson installed 200,000 3.5-inch diameter side-slit grow tubes, this time fastened with a staple and connected to the cordon with a wire "tube hanger." He reports the staple design is faster and easier to install and remove, and the tube hanger eliminates the need for a training stake.

Hodgkinson says that each of the design changes, added to the utility and effectiveness of the tubes and also decreased their cost. He paid about $1.25 for a 36-inch long grow tube in spring 1995, but in 1997, a 36-inch grow tube of similar material cost only about half that.

Results

Hodgkinson estimates that he saved 25% on water in the first year of the 1995 project planted between June 15 and July 15, due to grow tubes' capacity to capture and "recycle" water vapor transpired off leaves.

The vines also put on two years' growth in that first year, with 80% of the vines not only reaching the wire but also laying down two to three feet of cordon growth. He was also impressed with the stem diameter of the growth. He had heard about spindly growth in grow tubes, but his experience has been to the contrary.

Like other growers, Hodgkinson realized major savings in training costs. Even at the $1.25 tube cost in 1995, according to Hodgkinson, his savings on training costs "easily paid for the tubes."

Hodgkinson has also noted significant reductions in snail and cinch bug damage. Though these pests seem to thrive in milk cartons, they either find grow tubes impenetrable or the microclimate inside inhospitable.

Deer protection provided by grow tubes enabled Hodgkinson to get the vines in and growing before he could construct a deer fence. Without grow tubes he would have had to delay planting, losing much of that first growing season.

Hodgkinson now uses grow tubes on every development he installs. "I'm surprised not everyone is using them. With the way the price has come down, you can't afford not to."

Grow tube benefits at Bellerose Vineyard

1. 25% saving on water use.
2. Deer protection, allowing planting before construction of a deer fence.
3. Reduced training costs.
4. Accelerated, balanced growth — essentially two years of growth in the first year.
5. Protection from snails and cinch bugs.

JOHN BORELLI

Robert Mondavi Vineyards, Oakville, CA

Climate: Region II

Goal

Eliminating the need for hand hoeing — which costs $240 per acre per year — was Borelli's primary goal with using grow tubes in summer 1996. However, the tubes enabled him to strip spray the vine rows for further substantial savings.

He also wanted to reduce training and tying costs, which costs about $240 per acre.

In addition, Borelli had a third, unique, goal: to protect vines from the blue-green sharpshooter, the insect vector of Pierce's disease. Vines are most

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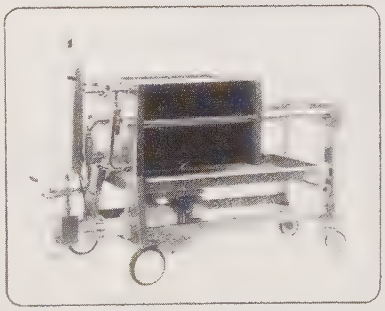

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susceptible to Pierce's disease when they are young, well-watered, and vigorous. The disease threat is especially severe at Mondavi's Oak Knoll Vineyard in Oakville, CA, due to the abundance of alternate host plants and the vineyard's proximity to a river that provides the wet habitat in which the blue-green sharpshooter thrives. Borelli hoped grow tubes would help deter the insect, either by serving as a protective barrier or by creating temperature and light conditions that would repel it.

A final objective was to protect young vines from "vertebrate pests" — deer and rabbits. "The wild turkey population in certain areas is exploding, and it's a real problem. They can't be fenced out, because they just fly over, and they'll strip all the leaves off a young vine."

Project

Borelli has experimented with grow tubes for a couple of growing seasons, and installed them on an entire 38-acre block planted in June, 1996. The green growing Merlot/110R vines are spaced 6x5.

When it came to watering the vines, he faced a dilemma. The nursery recommends dripping water directly into the wax pot of the green growing vines for four weeks after planting. The grow tube manufacturer recommends installing grow tubes on green growing vines immediately after planting, but recommends against dripping water inside of the grow tube (the same manufacturer recommends pre-wetting the soil and planting the vine so that the wax pot is completely submerged).

Borelli decided to conduct an experiment to determine which practice works best. On some of the vines, water was dripped through spaghetti hose directly into the wax pots for four weeks before installing the grow tubes. On the rest, Borelli installed grow tubes immediately after planting and dripped water just outside the tube (and therefore outside of the wax pot).

Grow tube used

Borelli chose 36-inch, twin-walled, 3.5-inch diameter, pink grow tubes with a side-opening slit. He had previously used the nested variety and noticed differences in growth between grow tubes of different diameters. Having grow tubes with one uniform diameter contributes to the uniformity of vine growth. Borelli also feels "double-wall tubes are far superior" to single-wall designs because they provide protection from leaf burn on hot days.

Results

The ability to strip-spray drastically cut hand-hoeing and training costs on this vineyard block and eliminated the need to use a hoe plow, which travels at an expensive 1.5 mph.

Borelli's experiment showed that the vines that received grow tubes at planting grew far better than vines with grow tubes installed four weeks later. Vines clearly received enough water, despite the fact it was not dripped directly into

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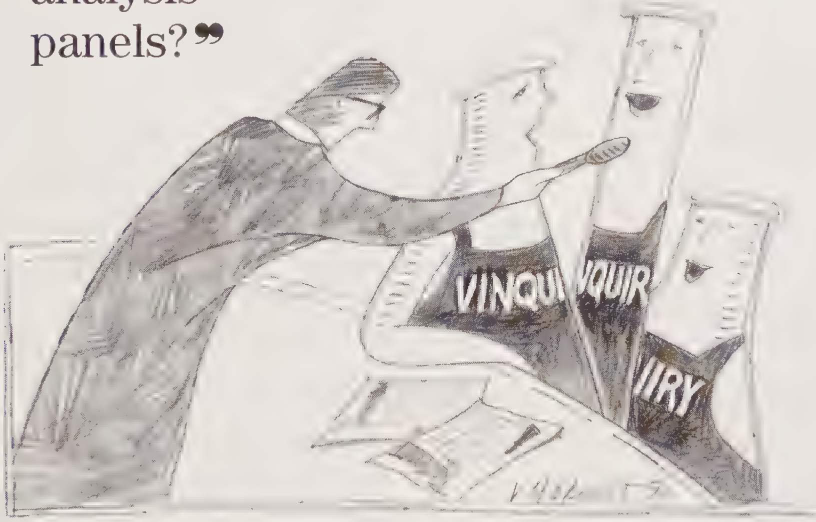

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the wax pot. Borelli plans to use this method on all future plantings.

The experiment was not designed as a scientific study of grow tubes' ability to protect vines from the insect vector of Pierce's disease, but Borelli says, "We think the grow tubes protected the vines. "The insect did not fly down the tubes to feed on the vines."

Grow tubes also reduced training costs and protected against animals as well.

Borelli also uses grow tubes for replants on blocks in Carneros. "With the high winds there, we have a terrible time getting replants established. Grow tubes dramatically increase growth in high wind areas like Carneros."

"I'm very enthused about grow tubes," says Borelli. "I wish I could use them on all our young vines." The only drawback, he says, is the per-acre cost — which is exacerbated by the high density plantings (6x5 and even 4x4) common at Robert Mondavi. However, premium grow tubes now cost about half what Borelli paid in early 1996, which he says tips the cost/benefit scale considerably in their favor.

Grow tube benefits

1. Elimination of hand cultivation.
2. Reduced training costs.
3. Accelerated, balanced growth, particularly on windy sites.
4. Protection from deer, rabbits, and wild turkeys.
5. Some protection from blue-green sharpshooters, the insect vector of Pierce's disease.

MIKE GATZMAN

Wente Brothers Winery, Livermore, CA

Climate: Region III

Goal

Mike Gatzman also wanted faster growth, and like Stasi Seay, he was looking for balanced growth — strong top, strong roots. He also wanted to protect new vines from rabbits and deer, which are particularly severe in his area.

Project

Demonstrating that the grapevine planting season can extend through summer into fall, Gatzman planted 317 acres of Cabernet Sauvignon, Chardonnay, and Merlot green-growing bench grafts. When bench grafts were planted, the graft union was covered with soil to prevent burning of the cambium layer, and the grow tube was put on immediately.

Gatzman insisted on correct installation of grow tubes. He made sure the base of the tubes were mounded over with soil, which helps create the greenhouse-like climate that accelerates vine growth. Leaving an air-gap at the base of the tube, according to Gatzman, "creates a chimney in hot weather." This chimney effect can dehydrate the vines.

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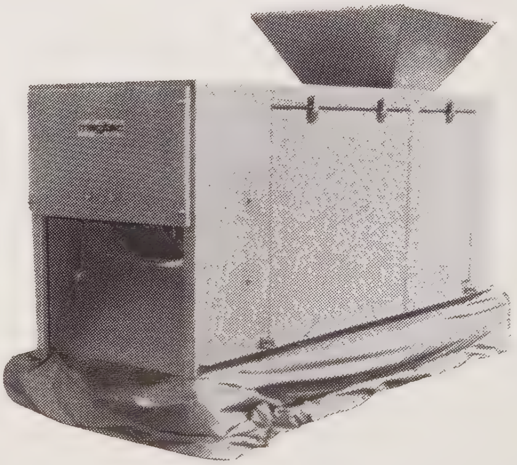

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Vines emerged from the 48-inch long grow tubes by mid-summer, far ahead of schedule. Gatzman liked the way grow tubes channel growth upward, rather than allowing vines to sprawl. In the past, the multitude of deer from nearby hills and ravines browsed new vines at Wente heavily, resulting in lost growth and increased training costs. Grow tubes effectively protected new vines from the deer.

Grow tube choice

Gatzman chose 48-inch, twin-wall, pink, solid (not side-slit) grow tubes which ranged in diameter from 3. 5 to 4. 5 inches. This design is well-suited to Gatzman's requirements. The 48-inch height enhances growth to the 48-inch wire with no training and more effectively shields vines from deer.

Results

"Enhanced growth is the primary benefit. It appears at this point that grow tubes will save one year [of time before first harvest]," says Gatzman. "Plants grow faster because a grow tube is like a miniature greenhouse. When it's cold outside, it keeps the plant warm, and when it's hot, it's more humid in the tube." Based on his success in 1995/96, Gatzman used grow tubes on the entire 317 acres planted in 1997. Ever the perfectionist, Gatzman thinks he achieved even better results in 1997. "I'm very pleased with the grow tubes," says Gatzman, "but we still have a long way to go in learning how to really handle them. We need to learn how to perfect the technique — how to drive grow tubes faster and use them better."

Grow tube benefits at Wente Brothers Winery

1. Accelerated, balanced growth rate, shaving one year off the time to first harvest.
2. Growth allocation (upward growth as opposed to "bushy" growth).
3. Shelter from deer and rabbits.
4. Protection from herbicides. ■

The above information was submitted by Treessentials Company. It was edited by **PWV** *staff, peer reviewed, and then reviewed for accuracy by all parties quoted.*

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Academic seminars complemented by supplier sessions

Globalization of the wine industry is presenting American winegrape growers and vintners with new challenges and opportunities. The Unified Wine & Grape Symposium at the Sacramento Convention Center in Sacramento, CA, on January 21-22, 1998, will give them an opportunity to examine those influences and explore new technologies aimed at providing them with a competitive edge domestically and internationally.

Ed Weber, University of California Cooperative Extension (Napa County), is chairman of the program committee for the "Vineyards & Vintners, A Global Perspective," tasked with helping American winemakers and winegrowers get the information they need to remain competitive in a global economy. "Our program committee is made up of experts from every sector of the wine industry — growers, vintners, researchers, marketers, suppliers, and reporters," says Weber. "The depth of resources, information, and ideas that we have been able to gather has been fantastic."

One new aspect that Weber says the program committee is implementing is supplier technical sessions aimed at tying the latest technological information with the suppliers who provide related equipment. "We want to give symposium attendees a complete educational experience without compromising the integrity of the information presented."

To accomplish this, the symposium has scheduled at least two supplier technical sessions to immediately follow traditional seminars. Informative seminars led by scientists, researchers, vintners, and growers will explore new technologies, providing a scientific and practical viewpoint. They will be followed with a supplier technical session on the exhibit floor, where providers of related technology will have an opportunity to introduce and discuss their technology.

"The idea of the supplier technical sessions is to invite companies who offer related technology to discuss their products after scientists and winemakers have made academic and practical presentations regarding the latest technology," explains U.C. Cooperative Extension Enologist Christian Butzke who is organizing the enology sessions together with Jane Robichaud, Director of Research at Beringer Wine Estate.

For example, on the symposium's first day, Butzke has organized a seminar to examine new ultra-premium winemaking techniques. The program will include discussions ranging from the latest gentle alcohol reduction and fining techniques to the use of artificial intelligence and computer programs to analyze historical harvest data, so a winemaker can predict and successfully resolve potential wine problems in future harvests. Immediately following that program, attendees will be invited to the exhibit floor where suppliers will introduce equipment that complements the seminar presentation.

"Technical supplier sessions like these have not been done before to my knowledge. People will have everything collected at one session," says Butzke.

"By keeping the scientific and practical information separate from the commercial information, we don't mix any interests. In other venues, there is sometimes a conflict between the commercial interest of the presenter and the winemaker's need for unbiased information. At the Unified Wine & Grape Symposium, there will be a very clear, logical separation."

> *"By keeping the scientific and practical information separate from the commercial information, we don't mix any interests."*

Dr. Keith Striegler, Julio R. Gallo Director's Chair, Viticulture & Enology Research Center (California

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Unified Wine & Grape SYMPOSIUM

State University, Fresno) is organizing the same type of supplier technical seminar dealing with recent innovations in vineyard mechanization.

Striegler will host a panel discussion with growers and researchers to explore the latest equipment available for mechanization of standard and high planting density vineyards. Also, techniques to maximize quality from mechanized vineyards will be examined. Panel members will discuss their success with use of mechanization and wine quality. Attendees can then move to the exhibit floor to meet with suppliers providing the latest technology to achieve these objectives.

"Anytime you can have the technology identified by university people and then have it backed up by vendors is great," explains American Grape Harvester's General Manager Ken Penfold who regularly exhibits at the Unified Wine & Grape Symposium.

"It should be a great help, mainly for our customers," Penfold adds. "Anything that helps customers ask the right questions, helps clear up myths. This should allow us to clear up some misconceptions and provide hands-on answers to their questions. For us, from a sales standpoint, this is strong, but I think it's especially good for the customers."

Steve Sholz, CEO of Associate Winery Systems, agrees that the supplier technical sessions will help attendees. "I think this is a great idea," he says. "There are a lot of new things this year and everyone needs a chance to look at this new technology. This will be a very helpful venue." ■

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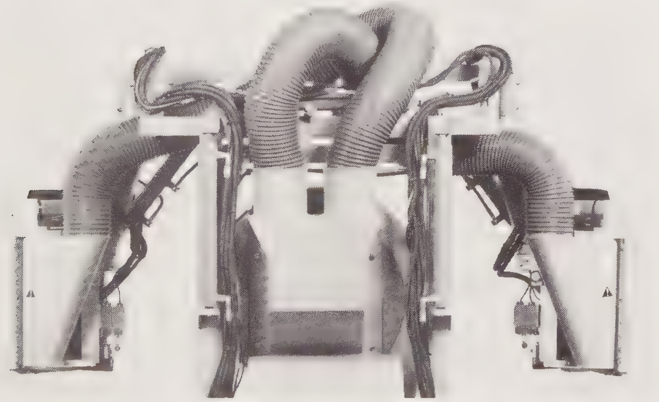

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Insights into BETTER TASTING ROOMS

Oval bar at Hess Collection Winery tasting room

by Craig Root

Part II in a series of articles examining helpful tools for successful winery tasting room staff based on interviews with industry leaders who share their insights with **PWV**-*readers.*

At the Hess Collection Winery in Napa Valley, the tasting room is unique. In addition to a full scale tasting and retail area, the winery also features a world-class contemporary art exhibition in two spacious galleries totaling 13,600 sq. ft. with more than 120 pieces.

A delightful 11-minute audio-visual experience created by Design Media in San Francisco, CA, takes visitors through a year in the Mount Veeder area which is home to many Hess vineyards. It is partly narrated by Donald Hess discussing his philosophies of growing in a mountain region, and it is dedicated to the people who work in these great vineyards.

Mary Lawler, who manages The Hess Collection facility, has a sophisticated warmth and wit coupled with a wonderfully calm hand at the tiller, which make her a superior visitor center manager.

Craig Root: Mary, how did you get in the visitor center business? I know you've had a variety of experiences in the field of food and beverage from restaurants to wineries.

Mary Lawler: After several wine courses through the University of California extension program, my first winery job was in the cellar at Joseph Phelps Winery. Later, I was hired on a part-time basis in the visitors' center at The Hess Collection Winery and have been lucky enough to evolve to my current job.

CR: What would you say are the elements of a good tasting room manager?

ML: Something that has struck a strong chord with me in the last year, particularly in dealing with staff, is that good manners take you everywhere. If you address people with good manners, you don't need a lot of rules. That kind of courtesy is effective throughout the whole tasting room experience. I try to remember that everyone has his or her own point of view. In essence, politeness promotes tremendous cohesion among the staff. I also believe in having a willingness to bend and sway with each interaction.

CR: One of the things I've admired about you is that you exhibit enormous calm, particularly during stressful moments. Do you have any secrets?

ML: Genetics! Mostly, I look toward the solution and focus on that. Also, I try to keep a broader perspective. Ninety percent of the things drummed up as a crisis are generally forgotten the next day. Staying calm helps me achieve a resolution faster and maintain a better relationship with co-workers.

CR: What do you look for in staff?

ML: I look for people who are interested in what they do, who have a spark for interacting with people. This includes an ability to listen well. When a customer asks for information or direction in making a purchase, this is a vital skill. A valuable staff member communicates well and embraces the challenge of endearing a guest both to our wine and to the Donald Hess art collection. Some of our guests are new to our wines and to contemporary art. This becomes our opportunity to create a Hess fan for life.

CR: Let's discuss the art collection. Explain the dynamics of running a tasting room with an art gallery.

ML: First of all, it is a huge bonus. Our guests often seek out our destination because they have heard of the collection. As I mentioned, the art acts as a catalyst for interaction between the staff and our visitors which is immensely valuable.

The challenges for me have been very interesting — whether it's learning about the care of the artwork or learning to discuss the collection both with people who are very knowledgeable (this is where I employ listening skills) and with those who want more information.

There are many natural segues between wine and art. Again, I consider myself very fortunate to have coworkers who have degrees in fine art, are artists, and are great at sharing their knowledge with me and their coworkers. James Bernstein, the conservator of the collection, is a tremendous help, and he has been crucial in helping me learn on the job.

CR: What about the forest fire that came within two miles of the winery in the summer of 1996? The entire collection had to be evacuated overnight. How was that accomplished?

ML: It was truly amazing. James Bernstein was instrumental. He dispatched and organized removal of the

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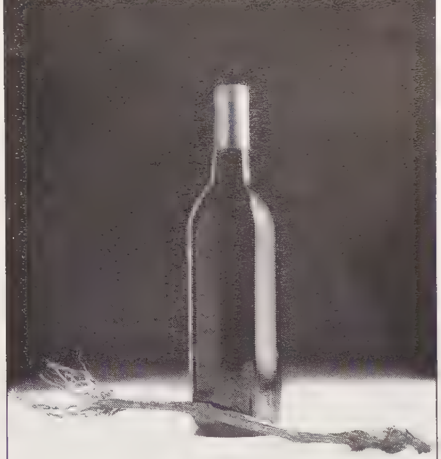

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pieces by a fine arts transporting company. I called Jim in San Francisco at 7:30AM, waking him, and yet he arrived at the winery at the same time I did. Meanwhile, staff went to the hardware store to find necessary items. I don't know if it would have come off any better, no matter how much preplanning might have been done. It was really the spirit of cooperation that pulled it off.

CR: What's your philosophy of customer service?

ML: Again, I believe that it's a good manners issue. First and foremost, I want the customers to feel comfortable. I also want them to feel that we appreciate their coming to visit us (the Hess Collection Winery). They chose to share part of their vacation time with us, and the number of choices they have is phenomenal. I know that sounds corny, but it's true. I also want the customers to feel engaged, to leave us feeling that we were worth the trip. I want them to leave feeling that the Hess label reflects great wine, good service and friendliness, and that this is a place they remember and feel loyalty towards.

CR: What about your oval tasting bar? One of the things that hurts sales in a tasting room is when second and third rows of people are lined up to taste in crowded conditions. If people feel crowded and don't get to interact verbally with the staff, they always buy less. Most counters have a "back bar" area where you can't relate to the customer. But your counter at Hess is free-standing and offers 360 degree access to the visitors which means a second or third row rarely occurs.

ML: That is a part of the original design that I highly recommend. It allows for more interaction with the customer with the same amount of staff. Every visitor is spoken to because each one is getting first tier treatment. We strive to have as much interaction as possible, and this tasting bar design really helps.

CR: I know I recommend it all the time for the start-ups I do (not that people always take me up on it). While it's more expensive initially, it more than

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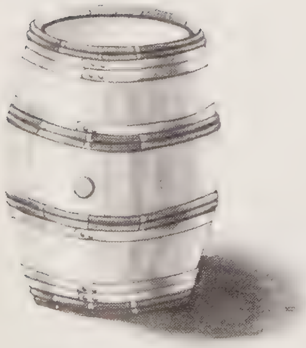

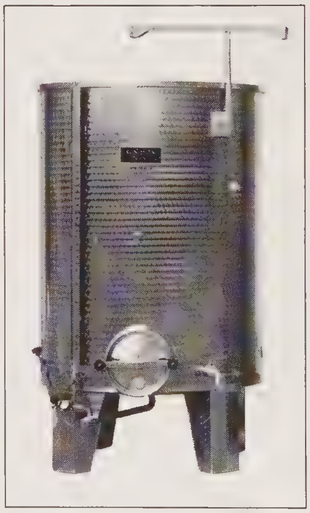

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pays for itself because increased interaction leads directly to increased sales. How about everyone's favorite topic — budget. Any tips on how you do your budget?

ML: It's been a really dynamic issue. When I started here, the wine was only distributed in 10 states, and allocation of the wine was not a complex issue. Now striving for consistent availability of the wine has been a challenge. We learned last year, when our '92 Collection Cabernet Sauvignon was highly ranked, [third in *The Wine Spectator's Best Wines of the World* issue] the importance of metering the wine fairly, so we keep the number of frustrated customers to a minimum.

Also, monitoring payroll is crucial. Particularly when you don't have enough wine to sell but you still have a high level of customer interaction. I always review the previous year's special events and payroll to keep on top of that issue. Also, I noticed in one of your other articles, that Jim Barfield mentioned that budgeting is not just a calculation of the wine cost but also of the resulting cost of packaging the wine, whether with wood boxes or paper products. I would be less than truthful if I didn't tell you that I'm occasionally caught off guard by little zingers like that.

CR: You have a new cash register system. Can you tell us about that?

ML: Ah! Cash register systems! I always remind myself as I approach headache territory that it's a money-in/money-out situation and that it should be as expedient as possible. We had to go to two registers about a year ago, and I wanted them to be easy for the staff and the customers. We purchased a Wine P.O.S. System from North Coast Retail Systems in Napa which has worked very well for us. I've found that most of the technical support is required in the first three months after installation. So when negotiating, it is useful to set up the contract with 50% down and 50% 90 days after installation, because it can take that long for problems like inventory control to come up.

CR: You have a very interesting array of non-wine items. What about non-wine item selection and tracking?

ML: To answer your last question first, the layout of our retail room allows for constant observation, plus I have a number of staff who are very interested in that area. Physical inventory of non-wine items is done every six months, so slow moving items are picked out. Coupled with the visual inventory, this keeps us on top of sales flow.

In terms of selection, I have to remember that we're running a tasting room and a museum store, so the non-wine items have to reflect that. Also, Mr. Hess has some wonderful connections in Europe which has allowed us to carry some unique items that have done quite well for us. There are other items I know could sell, but other wineries do a good job of merchandising them. We strive to find unique items. Our customers are also very family-oriented, so they want items that encompass that area as well.

CR: You also have a full-scale kitchen

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and dining room operation. Could you discuss that?

ML: I like the natural connection between wine and food! Well, the biggest factor again is staffing because most of our events take place in the evening. Since we always want a visitor center staff person to be a part of the evening events, so we can knowledgeably answer questions, it's a challenge to have staff for the day and then find fresh staff for the evening. Our events are also an asset because they add variety for the staff, and they love to sample Kate Sutton (our chef's) cooking!

CR: Do you have any good anecdotes from your years of working with the wine tasting public?

ML: I'm sure most of us in the business have had experiences with customers arriving after you've closed and giving you elaborate stories to get in. I literally had someone tell me they had come from Timbuktu.

We try to accommodate people, but I also have to protect my staff, particularly on extremely busy days. During the sales of our 1992 Cabernet Sauvignon, we had people come in, buy their two bottles, and then go out to the parking lot and change clothes to appear as new customers. Actually, I found one of my staff was selling cheap wigs down on the corner! (laughs)

CR: Any final thoughts?

ML: Yes, I think it's important to remember that we can all be a bit myopic about our area of the winery. It's important to look at the whole winery and keep the needs of other departments in perspective. I'm lucky because there is a great relationship with and accessibility between our different departments. This really makes for a nicer working environment. On a daily basis, having Philippa Jones and Darcy Hunt as assistants and having such a wonderful staff is the biggest plus of all. ■

Please look for future articles in this series. If you have comments or suggestions, feel free to call Craig Root at 707/963-7589.

Craig Root is a 26-year veteran of the wine and hospitality business, including 15 years at Beaulieu Vineyard. He has worked in all capacities at hospitality centers, primarily as manager. For the past four years, he has served as a consultant for visitor centers through his own company, Craig Root & Associates.

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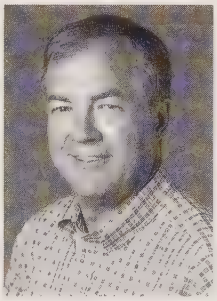
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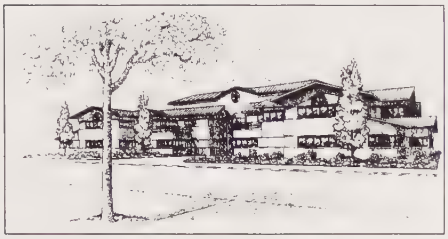

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Barbara Lindblom
1915 Diamond Ct., Santa Rosa, CA 95448
tel: 707/544-2910; fax: 707/544-3691

GOVERNMENT LIAISON SERVICES

Government Liaison Services (GLS) maintains one of the largest and most experienced staffs serving the wine industry. Since 1957, GLS has obtained BATF label approvals along with pursuing BATF rulings on formula submissions, lab analysis results, advertising, and many other BATF matters. GLS also specializes in performing Trademark, Patent, and Copyright search services.

For more information, contact:
Government Liaison Services, Inc.
3030 Clarendon Blvd., Ste 209
Arlington, VA 22201
tel: 800-642-6564, or
outside U.S.: 703/524-8200; fax: 703/525-8451
Please see our ad, page 42.

PACIFIC COAST FARM CREDIT

Pacific Coast Farm Credit is a locally owned agricultural lending association which is part of the nationwide Farm Credit System established in 1917. Pacific Coast Farm Credit is a cooperative, owned and directed by its members. Because of the association's specialization in agricultural finance, it offers advantages to wine industry customers, including a commitment to agriculture, knowledge of the industry, tailor-made programs, local decision making, and competitive rates.

Understanding the special demands of the wine and vineyard industry, Pacific Coast has programs to finance virtually every aspect of your business. These programs include long, intermediate, and short-term financing and leasing programs.

For more information, contact:
Pacific Coast Farm Credit
PO Box 929, Windsor, CA 95492
tel: 707/838-4866; fax: 707/838-3456
website: www.agloan.com
Please see our ad, page 24.

MOTTO, KRYLA & FISHER

Motto, Kryla & Fisher (MKF) is a leading firm of wine business consultants and accountants, providing business consulting, accounting, and tax services exclusively to wineries and vineyards. MKF is the only such firm devoted exclusively to the premium wine industry.

In addition to their professional experience as CPAs and business consultants, MKF personnel have academic and professional backgrounds in the wine industry. They publish articles, teach, research business issues, and consult with government and trade groups extensively on industry issues.

MKF is active in the legislative process and has been instrumental in drafting legislation affecting the wine industry. The firm has provided testimony to key policymakers and continually monitors proposed and enacted legislation, court cases, and other developments which may have an impact on wineries and vineyards.

As a wine industry specialist, MKF's consulting department offers sale and acquisition services, winery and vineyard business valuations, forecasts and business planning, strategic marketing plans, operations reviews, litigation support, and computer systems and support. MKF also provides many other management consulting services that draw on its industry specialization and expertise. MKF is often involved in an advisory basis in major transactions.

CPAs in the accounting department perform independent audits or reviews of financial statements. MKF financial reports are unique in providing insight into wine business results and trends.

MKF's tax department provides strategic tax planning for wineries and vineyards as well as transaction and individual tax planning. MKF's specialized industry expertise extends to income tax, estate and gift tax, and property tax.

For more information, contact:
Motto, Kryla & Fisher
The Wine Business Center
899 Adams St., Ste E, St. Helena, CA 94574
tel: 707/963-9222; fax: 707/963-1379
website: http:\\www.mkf.com

FIFTH RESOURCE GROUP

The Fifth Resource Group, LLC., is a full-service architectural/process engineering firm with a specialty in the wine industry. As owner's representatives, recent California projects include: Seguin Moreau, and Demptos Napa cooperages; masterplans and barrel warehouses for Franciscan Vineyards (Rutherford) and Seghesio Winery (Healdsburg); Korbel River Road Hospitality, Deli, and Brewery; Lake Sonoma Winery redesign. The Group has utilized industrial engineering methodology to do capacity planning models for many other California wineries.

The Fifth Resource Group services include feasibility studies, master planning, process sizing and flow analysis, architectural design, industrial engineer, construction documents preparation, government permitting coordination, construction bidding, and project management for new and existing wineries. Your facility needs are integrated to meet your business plan for acquisition, development, maintenance, and disposition.

For more information, contact:

The Fifth Resource Group, LLC.,
PO Box 30, Cotati, CA 94931
tel: 707/664-1797; fax: 707/664-1710
Call one of the co-principals directly:
Ed Sohl, AIA 707/953-8042
Jim Ford, REA 707/484-1688
website: http://www/fifthresource.com

ARTHUR ENGINEERING, INC.

Is your winery ready? Electric power deregulation is just around the corner, and will have a profound impact on the way you buy electric power and the price you will pay for it. Arthur Engineering can help you plan now so you are prepared to negotiate the most advantageous pricing when deregulation goes into effect.

Arthur Engineering, Inc., is an electrical and control system design engineering firm with a 27-year history of providing quality services to the wine industry. The company's wide range of experience and creative approach to every project have enabled it to become a valuable resource for a variety of clients both large and small.

Arthur Engineering understands the unique needs of winery clients and can provide main service design, power distribution systems, safety systems, lighting, or even microprocessor control of crushing, pressing, and bottling operations.

Whether you are contemplating a new facility, redesigning or upgrading an existing winery, or simply want to discuss the effects of electric power deregulation, the staff is confident that Arthur Engineering, Inc. will prove to be your best solution.

You can visit Arthur Engineering's *Electrical Resource Center* on the Internet at http://members.aol.com/Arthur Engr.

For additional information or a free brochure about electric power deregulation, contact:

Arthur Engineering, Inc.
6656 Owens Dr., Pleasanton, CA 94588
tel: 510/460-0845; fax: 510/460-0934

BILL KINZLER, ATTORNEY AT LAW

Bill Kinzler has a highly personalized style of practicing law which is based upon one-on-one interaction with his clients. Over the past several years, he has been working closely with clients to overcome California's restrictive tied house statutes, so wineries may diversify and expand their wine businesses into related areas.

Recently, he contributed an article entitled, "When the ABC Comes Knocking on Your Door ... Suggestions for Responding to an ABC Investigation," to the Family Winemakers of California Legislative Report, July 1997. In May, he was a guest speaker at California Polytechnic State University, San Luis Obispo, where he spoke to students in the wine marketing program on interstate distribution and sales.

Bill started his law practice in 1979 and specializes in matters relating to the California wine industry. He practices in the areas of alcoholic beverage regulation (state and federal), distribution counseling, and business transactions. His clients include wineries, brokers, importers, craft brewers, and retailers.

He is a member of the International Wine Lawyers Association, the American Bar Association sub-committee on alcoholic beverage practice, and an associate member of Family Winemakers of California and the American Vintners Association.

For more information, contact:

Bill Kinzler, Attorney at Law
100 Pine St., Fl. 21, San Francisco, CA 94111
tel: 415/986-4199; fax: 415/986-4195

LACALLE BILINGUAL CONSULTING & TRAINING

Do you occasionally need a qualified, bilingual professional who can help you understand and train your Spanish-speaking employees? In a cross-cultural workplace, the "people issues" are particularly complex. Dr. Trula Michaels LaCalle has the kind of cross-cultural, human relations expertise you may need with Hispanic cellar staff and vineyard crews. Beginning with a needs assessment consultation, she will help you discover how to improve employee relations and productivity.

Bilingual training modules are offered on subjects such as: supervisory training, cross-cultural communication, conducting performance appraisals, team building, conflict management, safety motivation and reduction of the utilization of worker's compensation benefits, enhancement of productivity, compliance with basic labor laws and employer policies, understanding company benefits and performance bonuses, and acceptance of changes within the company.

Dr. LaCalle is a non-Hispanic who draws upon 20 years of professional experience with Hispanics. Her PhD is in Leadership and Human Behavior. She is co-chair of the labor committee of the Sonoma County Farm Bureau and chairperson of the Sonoma County Hispanic Chamber of Commerce. She is licensed as a psychologist and has been a manager and business owner. She has authored articles for many publications, including a column that frequently appears in ***PWV***.

Dr. LaCalle's fees are in the moderate range for consultants. She will work within your budget, regardless of the size of your enterprise.

For more information, contact:

LPS, Inc.
Trula Michaels LaCalle, PhD
PO Box 518, Sebastopol, CA 95473
tel: 888/LACALLE or 707/829-9496
fax: 707/829-6981
website: http://ww.LaCalle.com

Please see our ad, page 38.

CRAIG ROOT & ASSOCIATES

Craig Root & Associates offers cost-effective opportunities to increase profits and enhance the visitor experience. Remember — you are not just selling wine — you are selling memories. An entertaining and informative visit to a visitor center stays in the consumer's mind long after more expensive advertising has faded.

The company's partial client list includes: Acacia Winery, Clos Pegase

Winery, Domaine Carneros, Handley Cellars, Heitz Wine Cellars, Indian Springs Winery, Jelly Belly Candy Co., Fess Parker Winery, Franciscan Vineyards, Freemark Abbey Winery, Kendall-Jackson Vineyards, Kenwood Vineyards, V. Sattui Winery, St. Clement Vineyards, Stag's Leap, Tra Vigne Restaurant, Vichon Winery, Wilson-Daniels Ltd., and Zaca Mesa Winery.

Craig Root's consulting services cover several areas of visitor center performance:

1. **Complete visitor center start-up** (cost control, hiring strategies, tasting logistics, tour creation, ambiance and display, visitor flow, and retail room/cash register setup).
2. **Appraisal of current operations** (through direct consulting and/or a "mystery audit" program) to cover all phases listed in #1. Including helping staff develop strategies for more effective tour guide skills, such as voice and delivery — through videotape assessment.
3. **Direct mail programs** (from start-up to fine-tuning an existing program).
4. **Trade relations**: How to achieve better results with your VIP buyers.
5. **Audiovisual presentations** (video and/or multimedia).
6. **Special events coordination** (catering, entertainment, decorations, and event themes).

For more information, contact:

Visitor Management Resources
Craig Root & Associates
744 Sunnyside Rd., St. Helena, CA 94574
tel: 707/963-7589; fax: 707/963-6009

Please see our ad, page 39.

HOYT SHEPSTON, INC.

Hoyt Shepston, Inc., has provided the beverage industry with decades of international transportation experience regarding the importation and exportation of beverages and related industry articles. Established in 1850, Hoyt Shepston is one of California's oldest custom house brokers and freight forwarders offering a full range of international transportation-related services. Whether shipping one case or a full container, by air or sea, from or to, Hoyt Shepston's staff of professionals and worldwide network of agents moves cargoes with little or no effort on the part of the client, whether in incremental parts or the total transportation concept, integrating all aspects of international trade from warehouse to warehouse.

Hoyt Shepston has the resources and the expertise to bring the products to and from their various international supply points. Import and export are relatively simple terms, but the process by which both are achieved is sometimes a totally different story and one that can be absolutely intimidating even to seasoned veterans. Hoyt Shepstons' specialists smooth the way, offering the full range of documentation services from standard to complicated requirements, including insurance, label approvals, BATF, drawback procedures, duty and quota requirements, letters of credit, and more, all backed by nearly 150 years' experience.

Hoyt Shepston has offices in South San Francisco, San Francisco, Los Angeles, and a worldwide web of national and international agents.

For more information, contact:

Hoyt Shepston, Inc.
700 A Dubuque Ave.,
South San Francisco, CA 94080
tel: 800/675-HOYT (4698); fax: 415/634-8066

STEEFEL, LEVITT & WEISS

Steefel, Levitt & Weiss law firm's Food, Beverage, and Agriculture Group includes attorneys and legal assistants having a major practice interest and expertise in the conduct and regulation of food and beverage manufacturing and distribution and agriculture. This includes transactions, financing, supplier contracts, grower agreements, litigation, product liability defense, regulatory matters, site acquisitions, business competition, pricing, and distribution.

Group co-leader Ronald Larson is a member of the Wine Institute (Public Policy Committee), the California Association of Winegrape Growers (CAWG), *l'Association Internationale des Juristes pour le Droit de la Vigne et du Vin* (President US Section), the California Farm Bureau, and a member of the California State Bar Standing Committee on Agribusiness. Members of the group are proficient in Chinese (Mandarin, Cantonese), French, Italian, Portuguese, Spanish, Tagalog, and Russian.

For more information, contact:

Steefel, Levitt & Weiss
Ronald Larson, Attorney
James Eastman, Attorney
One Embarcadero Center, 30th Fl.
San Francisco, CA 94111
tel: 415/788-0900; fax: 415/788-2019

FRED LYON, PHOTOGRAPHER

Fred Lyon is the wine industry's own photographer.

Anyone who has explored the world's famous wine regions has undoubtedly been inspired by Lyon's work in countless publications.

A Napa Valley grapegrower, Lyon maintains the world's most comprehensive and active collection of wine-related photography, **The Lyon International Wine Library**. It spans subjects from planting of vines to enjoyment of wine in the glass; from workers in vineyards and wineries to royalty in the grand salons of Europe; barrels, bottles, glasses, wineries, personalities, lifestyles, and recreation in the winegrowing areas; food, restaurants, and chefs. Many pictures are specific, but a full range of generic subjects is also available.

For wineries and wine marketers, Lyon creates strong, graphic images for persuasive advertising and brochures. This is high-energy photography from an unusual breadth of experience. Complete studio and unique location resources. Service that is friendly, rapid, and reliable. Wine never looked better!

For more information, contact:

Fred Lyon Pictures
237 Clara St., San Francisco, CA 94107
tel: 415/974-5645; fax: 415/974-5946

SILICON VALLEY BANK

Four years ago, Silicon Valley Bank identified the premium wine industry, which at that time most banks considered to be very risky, as an opportunity for service. Used to challenging conventional wisdom, Silicon Valley Bank applied the same business skills and analysis that helped it in software and semiconductors toward developing a methodology for serving wineries and vineyards. The results were extremely gratifying.

With an office in St. Helena focused exclusively on wine, Silicon Valley Bank's Premium Wine Division is providing a full range of banking services throughout the West.

It has now loaned some $80 million to more than 30 wineries. Silicon Valley Bank has staffed its Premium Wine Division with experts in wine lending who make loans only in this market. With $2 billion in assets, Silicon Valley Bank is the largest independent bank based in Silicon Valley, and it is the only bank in the United States with a division focusing exclusively on serving the financial needs of premium growers and vintners.

For more information, contact:
Premium Wine Division
Silicon Valley Bank
899 Adams Street, Ste G-2
St. Helena, CA 94574
tel: (707) 967-4825; fax: (707) 967-4827

Please see our ad, page 28.

PAIGE POULOS COMMUNICATIONS/ PPC WINECOM

One of the wine industry's most respected public relations agencies, Paige Poulos Communications/PPC WineCom is known for the creation and execution of strategic public relations plans that work.

Founded in 1990 by Paige Poulos, a veteran winery public relations executive, PPC is a small, dynamic agency with a proven track record. Agency clients range in size from tiny family operations to multi-national corporations.

WineCom, a network of specialists around the world, was founded by Paige Poulos in 1992. The individuals in this group bring specific expertise to PPC clients on a "when needed" basis. This network ensures that every PPC client gets the best marketing and promotion people available without expensive overhead for services that they need on an occasional basis.

PPC/WineCom's range of professional services includes strategic public relations plan development and implementation, media relations for domestic and international publicity, marketing communications, internal communications, special event coordination, and writing for presentations, collateral materials, and other publications.

"Our goal, for ourselves and our clients is preeminence among the very best," says president Paige Poulos. PPC doesn't charge for initial introduction meetings, and takes pride in providing services specifically tailored to each client's unique needs.

For more information, contact:
Paige Poulos, PPC/WineCom
PO Box 8087, Berkeley, CA 94707
tel: 510/528-0665; fax: 510/528-0667

SCOTT LABORATORIES, INC.

Scott Laboratories offers a variety of technical materials and services. These products are constantly changing in order to meet winemaker needs.

Scott Laboratories has been providing laboratory analytical services to the wine industry since its founding in 1933. The program includes wine testing, process consultation, and export certification. The laboratory is also certified by the State of California for water analysis.

Scottzyme enzymes are becoming an important tool for the winemaker. The importance of enzymes for yield, color, and filterability have been known for some time. In addition to improving color, Scottzyme Color Pro and Scottzyme Color X have important effects on phenolic and tannin profiles. Scott recommends Color Pro for "big" reds destined for aging and Color X for "ready-to-drink" reds.

Scott Laboratories' strong relationship with Lallemand continues for the 25th season. Together they offer an extensive variety of yeast, malolactic bacteria, and yeast nutrients. Lallemand is continuously researching and testing new products.

Scott Laboratories now carries specialty gelatins and tannins developed by Laffort et Cie. Gelatins and tannins are helpful tools for clarifying, stabilizing color, and for balancing the structure of wines. Gelarom is produced for clarification and ridding wines of off odors while the Gecoll Supra 95 and Gelatine Extra No. 1 will deal with any harsh tannins.

For more information, contact:
Scott Laboratories, Inc.
2220 Pine View Way, Petaluma, CA 94955
tel: 707/765-6666; fax: 707/765-6674
Scott Laboratories, Ltd.
1845 Sandstone Manor, Unit #14
Pickering, Ontario L1W 3X9, Canada
tel: 905/839-9463; fax: 905/839-0738

Please see our ad, pages 6, 70.

STORM ENGINEERING, INC.

Easily developed tracts of land for wineries are becoming very scarce, and as a consequence, the utility systems which must serve them become complex and oftentimes very costly. Water pollution and environmental regulatory compliance, administrative permitting processes, and governmental agency approvals occupy a large part of contemporary design effort that is required to make a winery concept a reality.

Whether it is having a working knowledge of the newest fire code edition or an understanding of the latest innovations in waste treatment technology, Storm Engineering Inc. (SEI) can offer the planning, design, and construction experience gained from working with more than 70 winery clients in the U.S. and overseas.

Six-inch raw winery wastewater influent line to rotary drum screen

SEI has honed its design skills so that utility plans can be carefully incorporated into the winery architect's space and site plan framework, while respecting the owner's construction budget needs and limitations.

Services of SEI span the full spectrum from pre-parcel acquisition assessments through system start-up and testing.

For wineries that prefer to use locally based professionals for utility design services, SEI can, through technology transfer and design review, make available 30 years of wine industry experience to ensure that workable systems will result.

Principal consultant, David Storm is the author of *Winery Utilities: Planning, Design and Operation*, Chapman & Hall, NY, December 1996.

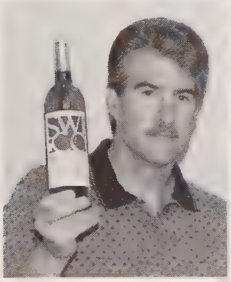
For more information, contact

Storm Engineering, Inc.
15 Main St., PO Box 681, Winters, CA 95694
tel: 916/795-3506; fax: 916/795-1119

SWI-CO CONSTRUCTION

Why involve Swi-Co Construction in your next building project? Swi-Co represents the most efficient transfer from concept to reality.

Swi-Co Construction is a partnership between Joseph Swicegood and Michael Coté, two Sonoma County contractors who have created a design/build team to assist wineries with their needs.


Roger Dean

The Swi-Co team approach involves designers, engineers, wine lab specialists, independent architects, and commercial kitchen experts who streamline the construction process. This high degree of professionalism improves communication and assures a seamless product considering all of the complexities of the wine production industry.

Permit processes are also streamlined with team engineers who are qualified to make inspections.

Swi-Co's complete design department with CAD facility enables clients to see projects in a color "walk-through" before they are actually built. Designer Roger Dean has worked for the California State Architect's office doing research and restoration of historic buildings. This has proved a valuable background considering the period reconstruction of a current Swi-Co project, Diamond Springs Winery in Alexander Valley, CA, where one winery building dates to the 1800s.

Lambert Bridge Winery owners chose Swi-Co Construction for construction management of their tasting room, roof, water systems, fire sprinklers, and commercial kitchen design.

For more information, contact:

Swi-Co Construction
Roger Dean, Associate AIA
791 Lombardi Ct., Ste 111
Santa Rosa, CA 95407
tel: 707/542-5464; fax: 707/542-1942

LAW OFFICES OF R. CORBIN HOUCHINS

For 26 years, R. Corbin Houchins has represented and counseled large and small clients, including other law firms, in distribution law, trade regulation, and intellectual property law, and in all legal matters related to the business of wine.

The Law Offices of R. Corbin Houchins provide businesses and their attorneys with cost-effective legal services to:

- Create and maintain contractual relationships for distribution, creative services, and all other aspects of brand management;
- Devise, protect, and profit from brand names, package design, slogans, production and marketing methods, and other intellectual property;
- Deal with regulatory requirements for operations, merger, acquisition, and capital formation;
- Protect their interests in the complex world-wide legal environment affecting commerce in brand name goods and services.

For more information, contact:

Law Offices of R. Corbin Houchins
3150 First Interstate Center
Seattle, WA 98104-400
tel: 206-343-9597 or 800-962-4805
fax: 206-223-2045
e-mail: RCH@vinlex.com

STATE FUND FARM BUREAU UNIT

State Compensation Insurance Fund is the largest workers' compensation insurance carrier in California. The Farm Bureau is the largest county, state, and national farm organization, working on behalf of agriculture and its rural communities.

John Balletto, owner of Balletto Ranch in Santa Rosa, CA, is a member of the State Fund Farm Bureau Group.

The partnership between State Fund and the Farm Bureau began in 1943. The partnership's main purpose, which is still the same today, was to provide farmers and ranchers with workers' compensation at a fair price while helping them reduce on-the-job accidents. It also provides members with free safety and educational materials, such as the popular Vineyard Safety video.

In addition to free safety and educational materials, members also enjoy a 12% discount and $100 minimum premium.

Let the State Fund Farm Bureau Unit provide your workers' comp insurance in this constantly changing market.

For more information on the group workers' compensation program, contact:

Your local county Farm Bureau office or the State Fund Farm Bureau Unit
tel: 800/773-7667

Please see our ad, page 18.

VINQUIRY

Vinquiry provides a full range of winemakers' services, complemented by a knowledgeable and accessible staff. For nearly two decades, founding partners Marty Bannister and MaryAnn Graf have specialized in this value-added approach, while fulfilling the needs of the winemaking community for analysis, consulting, fermentation supplies, and laboratory supplies and equipment.

Vinquiry is BATF-certified for export and distilled beverage analyses. Analysis panels — groupings of tests aimed at answering specific winemaking questions — provide cost-effective convenience to clients. Newly-added analyses include: assimilable nitrogen; filterability testing; 4-ethylphenol, quercitin, and resveratrol. Vinquiry also now offers photomicroscopy and custom culture preparation and maintenance.

In addition to labware, reagents, chemicals, and microbiology supplies, Vinquiry stocks a wide range of yeast, malolactic bacteria, and nutrients. Vinquiry is the exclusive U.S. distributor of the Enoferm line of yeast, and of Lallzyme EX, a unique enzyme preparation that improves color stability and enhances mouthfeel in red wines.

Call or fax for Vinquiry's catalog, and to receive *The Vinquiry Report*, a free quarterly newsletter filled with timely information for winemakers.

News Flash! Following the 1997 harvest, Vinquiry will move to a new facility! Thanks in large part to the loyalty and success of customers, Vinquiry must expand after 12 years in its current location. This relocation will enable Vinquiry to continue the evolution of its services, and ensure that it will continue to provide everything customers expect — with the best turnaround time in the industry.

For more information, contact:
Vinquiry
16003 Healdsburg Ave.
PO Box 695, Healdsburg, CA 95448
tel: 707-433-8869; fax: 707-433-2927

Please see our ad, page 38.

THE GROSKOPF COMPANIES

Groskopf is a major wine storage, distribution, consolidation, and transportation center for California, Oregon, Washington, and imported wines. Groskopf receives, stores, and ships over 8 million cases annually and currently represents over 3,000 line items. Each week, hundreds of carriers pick up wine from Groskopf's West and East Coast warehouses for transportation to points throughout the U.S., Canada, and international markets.

Groskopf offers three specialized divisions.

Groskopf Warehouse-West is a secure, temperature-controlled, fully insulated and computerized, 195,000sf facility in Sonoma, CA. GWI has a storage capacity of 1.3 million cases with easy access to all major interstate and intrastate highways, railways, and ports.

Groskopf Warehouse-East, just minutes from New York City's pier and rail ramps, offers safe, reliable warehousing, trucking, consolidation, and direct shipping of full and "less than container" loads throughout the East Coast and mid-Atlantic states from a 150,000sf complex.

Groskopf Logistics Services provides consolidation and direct interstate shipping of wines and spirits to all U.S. destinations including over 1,000 wine brokers and liquor boards.

Groskopf-Weider Trucking operates a truck fleet to transport cased and bulk wines to California cities via intermodal and container drayage.

BOOKSHELF

USE THE BOOK ORDER FORM ON THE POSTAGE-PAID ENVELOPE IN THIS ISSUE • Your wine books promptly shipped from one source.

Clonal Selection Symposium (Intl.) Proceedings (1995)
Portland, OR (ASEV). **160pp—$25.00**

Cooperage for Winemakers
Geoffrey Schahinger, Bryce Rankine
Manual on construction, maintenance, and use of oak barrels. User-friendly, informative text and photos. **112pp—$25.00**

Knowing and Making Wine
Emile Peynaud **391pp—$54.95**

Lexiwine
Paul Cadiau
English/French wine dictionary contains over 3,500 words and phrases on grape-growing and winemaking. **$10.95**

Production of Grapes and Wines in Cool Climates
David Jackson, Danny Shuster
193pp—$24.95 paperback

Rootstocks for Grapevines
D.P. Pongracz
Covers a wide variety of rootstock-related topics, reasons for grafting, soil adaptation, influence on crop quality and size, and general ampelography. **150pp—$30.00**

Sunlight into Wine
R. Smart/ M. Robinson
Quality assurance in vineyards, canopy management and economics, improvement of canopy microclimates, importance of winegrape canopies, construction of trellis systems. **88pp—$35.00**

The Taste of Wine
Emile Peynaud
A masterclass on the science, procedures, and vocabulary of the trade for the professional. An essential work of reference for the amateur. **258pp—$39.95**

Techniques for Chemical Analysis and Stability Tests of Grape Juice and Wine
Patrick Iland, Andrew Ewart and John Sitters
Sampling procedures, analytical methods and techniques, stability tests and fining trials for the laboratory. **65pp—$50.00**

Using Grapevine Rootstocks, The Australian Perspective
Peter May
Use of rootstocks in Australia including physiology and factors affecting rootstock choice. **62pp—$19.50**

Vineyard Management Practices: An Environmental Approach to Development and Maintenance
Southern Sonoma Resource Conservation District and Soil Conservation Service (U.S. Dept. of Agriculture) **300pp—$29.95**

Viticulture, Vol. II, Practices in Australia
B.G. Coombe, P.R. Dry
Grapevine propagation, vineyard establishment, pruning, canopy management, irrigation, drainage and soil salinity, soil management and frost control; grapevine nutrition, grape pests, disease, protection. **384pp—$42.50**

Viticulture & Environment
John Gladstones
Selection of site, variety, and cultural practices. Detailed climactic analysis of Australian and world viticultural areas, evaluation of new viticultural sites and possible changes in the climactic conditions. **310pp—$45.00**

Wine Analysis and Production
B. Zoecklein, K. Fugelsang,
B. Gump, F. Nury
A practical understanding of quick screening assays, wet chemical and instrument analysis plus results and interpretation of winemaking. **512pp—$79.95**

Wine Aroma Defects
1992 ASEV-ES Workshop Proceedings
92pp—$15.00

Wine Growers Guide, *NEW* edition
Philip Wagner
Easy to understand essentials to establish a vineyard, pruning, training, vineyard management, propagating vines, and vine ailments. **240pp—$19.95**

NEW
Wine Microbiology
Kenneth C. Fugelsang
Provides background information, step-by-step laboratory procedures, and interpretation of results. **245pp–$79.95**

Wine Spoilage Microbiology Conference Proceedings (1996)
at Cal. State University – Fresno
Nine papers from Germany, Italy, Switzerland, and U.S. **83pp—$20.00**

NEW
Winery Utilities Planning, Design, and Operation
David Storm
Describes each of the major components of winery utility systems for planning, design, and operation. **550pp-$99.00**

Winegrape Grower's Guide (Oregon)
Oregon Winegrowers' Association
Viticulturists, researchers, and winemakers combine efforts into 30 chapters on: Selection of variety/site, rootstock, spacing, training, trellising, grapevine propagation, fertilization, pest management, yield prediction, winter injury, vineyard economics.
264pp—$29.95

For importers who desire immediate national distribution of their wines in the U.S. and Canada, Groskopf can assist in implementing a cost-effective export program including handling of government regulation and state licensing requirements, product registration and reporting, price posting, and liability and product insurance.

For more information, contact:
The Groskopf Companies
20580 8th St. East, Sonoma, CA 95476
tel: 800/479-9459; fax: 707/939-3112

THE WINE LAB

Now entering its 23nd year, The Wine Lab benefits from many years of practical wine industry experience. Analytical services are only a part of the range of technical and practical assistance provided for winemakers by founding director Lisa Van de Water and enologist Michael Murtaugh.

It is not difficult to test pH, malic, SO_2, or ammonia, but The Wine Lab's special expertise is in using test results to assist in maintaining and improving wine quality and answering questions such as what to do about high pH, how to finish a stubborn MLF, should SO_2 be added, and how much supplementation is needed for low-ammonia must. The company motto, "More than just numbers" expresses a commitment to helping winemakers understand what their results mean.

Unsurpassed in sleuthing the causes of spoiled wine, The Wine Lab emphasizes problem solving and troubleshooting, offering advice tailored to fit each winery's specific circumstances, from 50 gallons to 50 million.

Always at the forefront of microbiological developments, The Wine Lab has long researched topics such as Brettanomyces/Dekkera, Zygosaccharomyces, Lactobacillus spoilage, sulfide treatment, ML inoculation, and fermentation nutrient requirements. New additions to the microbiological services available include DNA electrophoresis to identify yeast strains and culturing vines for Phaeoacremonium ("black goo").

The Wine Lab is also dedicated to making technical information accessible to winemakers through clearly written literature, hands-on classes and workshops for wineries, and international Internet connections. Lisa Van de Water has given technical presentations in 20 states, Canada, and New Zealand for over 20 years.

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My Favorite Wines

(tune: My Favorite Things)

by Bonnie Abrams, Assistant Winemaker
Widmer's Wine Cellars, Naples, New York

I like dry Riesling — I find it so pleasing
With hints of dried peaches — my palate it's teasing
In cool climate chalky soils where it grows fine
This is just one of my favorite wines.

I love a Zinfandel — smell that black cherry
Smoky and spicy, it makes me so merry
I wish we could grow it in New York state
Served with beef satay — it really goes great!

Chorus:
When the day's long and I don't feel strong
I need to unwind
I simply pour one of my favorite wines
And that makes me feel just fine.

Chardonnays with that long buttery finish
Served with phyllo dough stuffed with feta and spinach
Or that green apple style once in a while
With poached or grilled salmon — that makes me smile.

Cabernet Sauvignon blended with Merlot
And with a touch of Cabernet Franc also
Served with rare roast beef and wild mushroom pie
So many fine wines — which one should you try?

Chorus:
When the day's long and you don't feel strong
You need to unwind
Simply pour one of your favorite wines
And then you will feel just fine.

Gewurztraminer with Thanksgiving dinner
Pinot with Peking Duck — also a winner
Great wine is great art and good for your heart
Drink to your health — now's a good time to start.

Wines from Ontario and from Ohio
From Pennsylvania, New York, and you'll try so
Many good wines from the central U.S.
The East and the West Coast — drink what you like best.

Chorus:
When the day's long — and we don't feel strong
We need to unwind
We simply pour all of our favorite wines
And in no time, we feel divine!

PACK EXPO WEST 97

Packaging innovations for bottlers and wineries

Learn about the newest developments in packaging and bottling at Pack Expo West 97, a packaging technology trade show to be held October 13-16 at the Sands Expo and Convention Center in Las Vegas, NV. Pack Expo West 97 will feature pressure-sensitive labelers, coding devices, and other packaging solutions vital to the wine industry.

Sponsored by the Packaging Machinery Manufacturers Institute (PMMI) and inaugurated in 1995, Pack Expo West occurs every two years. This year, more than 520 exhibitors will occupy over 250,000 sq.ft.

Pack Expo West will be co-located at the Sands Expo and Convention Center with The Food Processing Machinery & Supplies Association's (FPM&SA) International Exposition for Food Processors (IEFP).

Bottling and then some

Don Hudson is an owner of Chateau Bottlers, a contract bottling company that handles the annual bottling needs of 10 to 18 wineries throughout northern California. Accustomed to attending primarily wine industry shows, Hudson attended the first Pack Expo West in 1995 to evaluate a larger scope of packaging equipment and learn more about bottling equipment and the packaging industry as a whole.

At Pack Expo West 97, Hudson plans to purchase equipment designed to improve bottle appearance, such as pressure-sensitive labeling equipment and coding devices that can mark clearly on glass bottles. "This equipment," says Hudson, "will allow us to provide our customers with crucial marketing benefits."

Pressure-sensitive labeling enables the wine industry to manufacture the most sophisticated package possible, notes Hudson. As a result, pressure-sensitive labeling is becoming popular because it allows for more graphics on the label, and makes it easy to place labels on the bottle neck. Pressure-sensitive labelers also require less changeover and cleaning and leave no glue smears. These are important production benefits." At Pack Expo West 97, Hudson will evaluate which pressure-sensitive labelers will work best for him.

Hudson will also use Pack Expo West 97 to identify coding machinery manufacturers with systems that can mark small batch codes on inconspicuous areas of the bottle. "An unattractive, obvious product code can detract from the product aesthetics wineries work so hard to perfect. At Pack Expo West 97, I'll be able to see many types of coding systems available."

Discovering solutions at Pack Expo West 97

During the Pack Expo West 97 interactive conference program, Solutions 97 — Packaging & Processing Technology Conference, Hudson and other bottlers and wineries will hear leading packaging experts and machinery specialists address foreseeable packaging trends and answer their packaging equipment questions and concerns.

One Solutions 97 session of particular interest to bottlers and wineries will be, "Adapting production lines to fill, convey, cap, label, and case unusually-shaped glass bottles," Monday, October 15, 9:15AM to 10:15AM. Bob Pease, regional sales manager, Krones, Inc., Franklin, WI, will discuss how California-based wineries and beverage bottlers are fulfilling the special packaging and handling requirements of extraordinary glass container shapes.

As part of Pease's presentation, he will explain how Krones helped Kendall-Jackson Vineyards & Winery solve the production challenge posed by its proprietary tapered Claret bottle. Because the bottle's base is narrower in diameter than its top, Kendall-Jackson was faced with the task of maintaining line speed efficiency with the unique, top-heavy container.

Pease will present the production line problems associated with top heavy containers, and how Krones was able to develop a bottle rinser, bottle conveyor, cold-glue labeler, slat divider, and case packer to work effectively with Kendall-Jackson's tapered bottle package.

Besides learning about packaging machinery solutions, Hudson says Pack Expo West also enables him to see the latest innovations in packaging containers, designs, and materials. "This balanced mixture allows me to cost-effectively look for trendy items that can further enhance product appearance," notes Hudson.

At exhibit booths, the show's many technical experts help Hudson identify the best system for his specific application. "The show provides the best of both worlds — expert technical advice, and the chance to see systems up close and in operation. Since I own a mobile bottling unit, proper evaluation of features such as footprint space is crucial.

"Staying up to date with the latest packages, materials, and equipment is vital to my business and my customers. Pack Expo West allows me to do this," adds Hudson.

Registration for Pack Expo West

For more information, on Pack Expo West 97, contact the PMMI Show Department at tel: 703/243-8555; fax: 703/243-8556; e-mail: expo@pmmi.org.

For more information on the Solutions 97 — Packaging and Processing Technology Conference, contact the PMMI Education Center at tel: 703/243-8555; fax: 703/243-8556; e-mail: education@pmmi.org.

Attendees can register free for the expo and conference and obtain other information by using the Pack Expo West 97 Fax on Demand service: 800/585-8098 (U.S. and Canada), or by accessing the PMMI Pack Expo West 97 website: http://www.packexpo.com.) ■

by Dr. Richard Smart

Vineyards of the next millennium

There are only three harvests left of this millennium, and it is therefore interesting to pause and reflect about the vineyards of the future. What will the vineyards of the 21st century be like? Are there now obvious trends, which we should allow for in our present vineyard planning?

I once heard a talk about viticulture in the future in which the speaker waxed lyrically about miniature vines in flasks in growth cabinets producing the perfect grape in a controlled environment. I think this so much fantasy, and I am sure we will have to continue to deal with Mother Nature for centuries to come. We must continue to learn to live with and optimize variability in soils and climate.

In this column, I have pulled together some thoughts about the form vineyards of the future will take. I am lucky, in my work, to visit many of the world's best vineyards and to listen to ideas from many clever viticulturists who are continually thinking about how to improve their vineyards.

My remarks offer a global perspective and are particularly relevant to New World, and specifically North American, viticulture. I would expect that many of these ideas would be commercially in vogue by the year 2010.

Vineyard economic and social environment

Already, we see an apparent marked tendency toward larger vineyard size. There are obvious benefits of economies of scale, especially as vineyards become more capital intensive. Hand labor will continue to be displaced by machine, and for many vineyards the annual labor input will fall below 40 man hours per acre — that is one worker week per acre or one worker per 50 acres.

Some vineyards in Australia already work at around half of the above worker input. This will happen even in countries with so called cheap and abundant labor, such as those in South America. Witness the dramatic increase in mechanical harvester use in Chile over the last few years. I do not anticipate that robotics will have a significant impact on vineyards, as their undoubtedly large cost and complexity will be prohibitive.

Vineyard management input per acre will also fall, due to less requirements for labor management and more reliance on electronic monitoring and computers. As weather forecasting becomes more accurate, vineyard operations like spraying will become more timely and efficient. Vineyard managers will be required to be better trained not only in viticulture but also in ancillary management skills such as human resources.

I expect more women will become vineyard managers, and I wonder will they ever be in the majority? Computer-based expert systems will be helpful to managers of the future, but I believe that the shadow of the manager will remain the most important input to the vineyard.

Declining government support

I see an established tendency for indirect government support to industry to decrease. This will be particularly evident in reduction of research and extension resources, which seems a worldwide trend. Members of industry might work together to establish funding for these activities. Otherwise only larger corporations will be able to invest in research, and the results may not be in the public domain.

From a plant disease viewpoint, this lack of government expertise, regulation, and monitoring will place industries at greater risk, as is becoming quite apparent. Increasingly private consultants will replace extension agents, and there will likely be more hired management input.

Global wine markets

Wine markets will become increasingly global, and producers will need to adopt internationally competitive standards. No longer will it be sufficient to do better than one's neighbors; someone from the other side of the world will become your true competition.

Wine brand names will become increasingly important. European producers will increasingly realize that they are disadvantaged by restrictive laws like yield limits, variety use restrictions, and irrigation bans, and perhaps more countries will follow the recent Spanish example and drop some or all of these.

Producers world wide will be competing aggressively in existing markets, and likely in the future, many will turn their eyes towards developing markets in Asia, with its vast population and wealth and early signs of increasing wine consumption.

The term "wine quality" will be replaced in common usage by "wine price point" or "wine end use" in recognition that wine quality is not a black and white issue but one with many shades of gray and concomitant important commercial implications. Lower potential sites producing at low yields in established quality regions will maintain high price points, but these will come under increasing pressure from less expensive wines made with similar varieties but at higher yields using canopy and irrigation management procedures.

Vineyard technical developments

I think there will be fewer technical developments than we expect, as I believe there are few major innovations yet to be made. More likely it will be a case of refining existing ideas, technologies, and materials.

There will likely be a continued expansion of new vineyard regions, often for the reason that producers will want to take advantage of cheaper land and or improved climate or water resources. Small and establishing producers, especially in new regions, may be able to maintain economic viability because of value added through wine retail and tourism.

Vineyard site selection will become more precise, and land will be purchased for its specific climactic and soil properties. It is becoming increasingly easy to predict vineyard yield, vigor, disease pressure, and likely wine style and price point from critical evaluation of climate and soil properties. Countries like Chile and Argentina, which have an enormously wide range of suitable climates and soils, might take advantage of this situation.

Vineyard mechanization will become more widely practiced. Cultivation and spraying have been mechanized for many decades, and harvesting and summer and winter pruning more recently. In the future, we can expect to see mechanical leaf removal and shoot positioning become more common and mechanical winter prepruning become much more widespread.

For those operations requiring less horsepower, smaller and lighter tractors will be used, principally to avoid soil degradation by compaction. For example, weed spraying from an All Terrain Vehicle (ATV) is becoming more widely adopted.

There will be a continued trend toward fewer and "softer" agricultural chemicals, and advances in weather prediction should lead to the more rational use of some sprays. The philosophy of vineyard monitoring and integrated pest management will become even more commonplace.

Of all present machinery, vineyard sprayers are likely to be modified most, as it will become increasingly common to use recycling units with savings to the environment and of chemicals. The use of non-tillage might have to be reviewed, because vineyard weeds can harbor insect pests or diseases, as is being found with phytoplasma diseases in Europe and Australia, for example.

Soil moisture monitoring will become more commonplace, as will irrigation manipulation to regulate production and wine end use. Increasingly, irrigation systems will be connected to soil moisture sensors and weather stations to automate irrigation, and so take some of the guess work out of irrigation application.

Trellis design will probably change little, although a few more designs are possible and might become popular. Material use might change (I recently saw price competitive stainless steel wire and anchors in Chile), and there is still room for applying more engineering to trellis components.

Changes in plant material

I think we will begin to encourage wine consumers to greater rather than narrower choice of varieties, and this will lead to more variety choice in the vineyard. There are a few good French varieties yet to be used; Carmenere, the red variety, is a good example. I think there will be an increased awareness of Italian varieties as is already beginning. Further in the future, I predict the increased use of the excellent red and white varieties from Portugal and, to a lesser extent, from Spain.

Some scientists will argue that varieties modified by molecular technology will have increasing importance. I rather doubt this in the short to medium term. Would you replace an existing Chardonnay vineyard with a genetically modified Chardonnay just so you did not have to spray for powdery mildew? What if there was legal doubt about the use of the

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name Chardonnay for a Chardonnay vine which was now mildew resistant?

Interestingly, newly created varieties using classical hybridization may have a revival. Recently I was impressed by the variety Chardonel bred at Cornell University, Geneva, NY, which has shown low susceptibility to powdery and downy mildew, bunch rot and phylloxera. In Germany, they are removing labeling restrictions from wines of new varieties with true disease resistance which should lead to their increased use.

I hope that, within this time frame, our knowledge will have progressed sufficiently to produce reliable chemical tests of grapes which can be predict wine price point and style. This will justify more vineyard management procedures to balance price point/yield issues.

Most people would, I think, agree with most of the sentiments expressed here, as most ideas are not particularly radical or new. Viticulture in many parts of the world is very traditional. I think that the profitable producers in the beginning of the 21st century will be those who adopt new technology and make other necessary adjustments. ■

Dr. Richard Smart, "the flying vine-doctor" is an international viticultural consultant, reachable in Australia by fax at 011 61 65 84 0121, or by e-mail: smartvit@midcoast.com.au. He visits America frequently and can be contacted at Vinquiry in Healdsburg, CA, phone: 707/433-8875.

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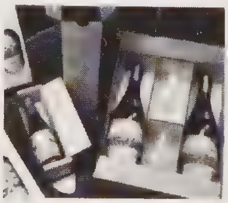

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Can we recommend wine?

Dr. Andrew Waterhouse, Dept. of Viticulture & Enology
University of California, Davis

Edited from a presentation to the Society of Medical Friends of Wine, October 1996, San Francisco, CA.

I would like to thank the Society of Medical Friends of Wine for the Leon D. Adams 1996 Research Award. In particular, I would like to thank Dr. Paul Scholten, chair of the Research Committee, and Dr. Michael Knauer, 1996 President of the Society.

I would be remiss if I did not also mention the many other scientists who have been important collaborators over the last few years on our studies involving wine and health. In particular, I want to mention Edwin Frankel (the 1995 Research Award recipient) and Bruce German from the Department of Food Science & Technology, and Rosemary Walzem from the Department of Molecular Biosciences, (University of California, Davis). There have also been several student collaborators including Pierre Louis Teissedre, now at University of Montpellier, and Rosa Lamuela-Raventos, now at the University of Barcelona.

Interest in the health effects of wine has been sparked by epidemiological studies. These have been both ecological and prospective, but one factor has always been true — wine consumption has been universally associated with reduced heart disease mortality.

In the prospective studies, some have found that moderate consumption, that is two glasses per day for men and one for women — produces the lowest mortality rates; others indicate that higher consumption rates are better. But let me reiterate: Every epidemiological study that has investigated an association between wine consumption and heart disease mortality has found an inverse association — wine consumption correlates with reduced mortality.

As Serge Renaud's "French Paradox" study showed, these investigations are very powerful, and in fact, most of the public policy discussions today are based on the epidemiological results. However, despite their power, these studies cannot explain why the associations they observe exist.

Shortly after the "French Paradox" study was published, a group at UC Davis that included Edwin Frankel, Josef Kanner, Bruce German, and the late John Kinsella proposed a mechanistic explanation. They showed that wine had an antioxidant effect and theorized that this effect could reduce heart disease by slowing plaque formation. At present, this theory has been widely accepted and is being actively investigated by dozens if not hundreds of investigators.

The theory is based on the pathology of atherosclerosis which is initiated by damaging oxidation to Low Density Lipoprotein (LDL, the *bad* cholesterol) particles in the arterial wall. The damaged particles initiate many other steps which ultimately result in plaque. The question is, can wine components act as antioxidants and inhibit the initial oxidative damage to LDL?

Continued on p.64

In support of the Dr. Waterhouse challenge

Dr. Wells Shoemaker

Dr. Andy Waterhouse's challenge to the Medical Friends of Wine strikes a familiar chord. Despite robust and consistent scientific support for the beneficial role of moderate alcohol consumption, and wine in particular, the larger medical community seems sluggish to recommend the practice to Americans.

We are not abandoning hope, however. Though battleships don't turn on a dime, medical thought on this subject has been steadily veering to port in the last ten years.

A decade ago, medical editors typically dismissed data describing dramatic reductions in heart attacks, the nation's leading cause of death, because the "intervention" of alcohol had such presumptively ponderous risks.

Oddly, editors never challenged the issue of "dose" as they consistently did for other therapeutic agents under scrutiny. Heavy amounts of alcohol were unquestionably damaging. Moderate dosages were casually assumed to be merely a little less damaging, without ever testing that assumption. They were wrong.

Seeing the Light

The subsequent evolution of tighter epidemiological studies, coupled with the identification of at least four biological mechanisms by which both alcohol and specific wine components reduce heart attacks, led to a reluctant acceptance of the information. Furthermore, data repeatedly showed that moderate drinkers had lower death rates from all causes in sum, not just heart attacks.

Additionally, a host of other chronic illnesses appeared reduced among moderate drinkers (stroke, peripheral vascular disease, diabetes, gall bladder disease, osteoporosis, depression, and arthritis). (See *PWV* articles listed below.)

Editors, however, heavily cautioned against "reckless" promulgation of this information for fear of triggering a wave of abusive drinking among previously temperate people. There was no scientific rationale behind this fear, although it plodded along a safe political path. (See "Alcophobia," page-5, Jan/Feb'93 *PWV*.)

The tide is turning — slowly

Finally, the last three years have yielded a shift in editorial policy at several of the nation's leading medical journals and even the 1996 federal dietary guidelines. Multiple authors have suggested that the science surrounding the preventive attributes of moderate alcohol consumption has matured enough that it is no longer defensible to obscure this information from individual patients.

The question is: How fast does epidemiological and biomedical research penetrate into actual medical practice? Unfortunately, the answer is: slowly.

Busy doctors don't read their journals as avidly as they did

Continued on p.65

Waterhouse continued from p. 63

We have shown that it is certainly the phenolic compounds in wine which contribute its antioxidant activity *in vitro*. We have also tested a large number of wines and have shown a clear relationship between phenolic content and antioxidant action. Our results were overinterpreted in the media in an attempt to lead consumers to the wine "best" for the heart.

Remember, so far we are working with a well-accepted theory. But the results can be used to evaluate which wines are high in antioxidant activity, and it is those with the highest tannin levels. This is because the level of tannin in wine is closely correlated with the level of the other phenols. So if you want the "healthiest" wine, the most astringent, robust, or highest body wine is the one for you.

We have also characterized the antioxidant action of many individual phenolic compounds and what we find in our test is that they have similar activities. So, in simple oxidation reactions, it looks like all wine phenolics act in the same way.

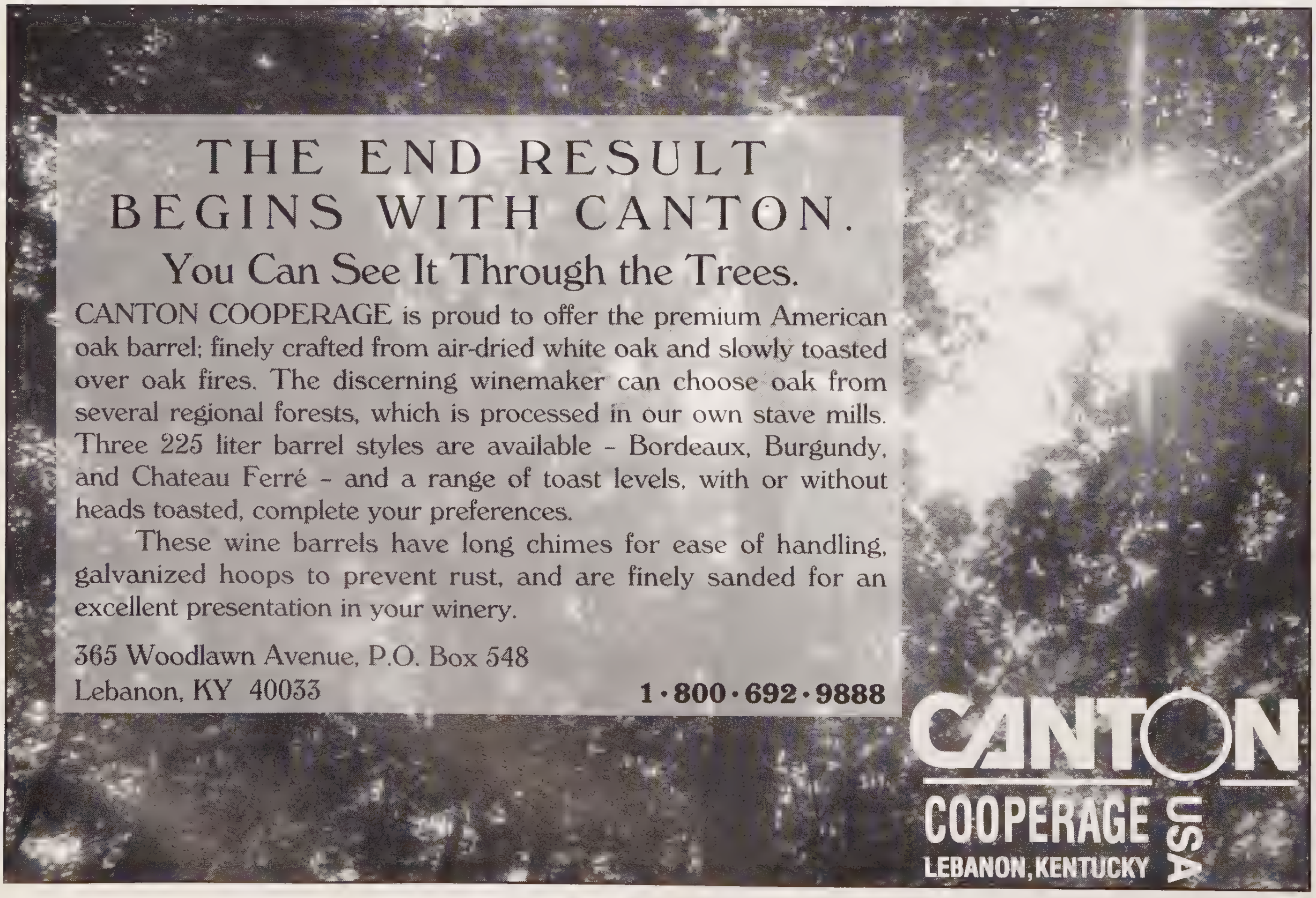
The antioxidant theory has also illuminated potential explanations for the well-recognized health benefits of tea or fruit consumption, although many of you will be disappointed that I have not yet found any report of such an observation for a similar, striking effect from chocolate consumption. All these foods are rich sources of phenolic compounds, and there are some epidemiological observations that fruit and tea consumption are related to reduced heart disease. There are also suggestions that cancer rates may be reduced by diets rich in some phenolic sources.

In addition, several scientists are also proposing related but different mechanisms to explain the "French Paradox." Dr. John Folts at the University of Wisconsin published several papers clearly showing that wine contains clotting inhibiting factors, and Dr. David Fitzpatrick in Florida has some data showing that wine contains vaso-relaxing factors.

All in all, these investigations act to explain the observed relationships between wine consumption and reduced disease, and have continued to support the general theory that the phenolic substances are involved. Much work remains, including measurements of absorption and analyses that can discriminate between the effects of the dozens of major phenolic substances in the diet.

While there is much to be done to explain the effect of wine, and my lab is heavily involved in the investigation, presently it is clear that whatever the reason, wine (and perhaps beer and spirits) consumption is associated with reduced mortality.

Dr. Curtis Ellison from Boston University has estimated that in practical terms, for those who have heart disease, moderate drinking has more health benefit than any other normal measure (such as diet or exercise) except smoking cessation. Physicians cannot ignore this tremendous health benefit, but **can they recommend wine**? Their patients need



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Waterhouse continued

proper guidance. I have heard from many friends that their physicians are recommending moderate wine consumption, but from other friends that their physicians are discouraging any alcohol consumption at all. Certainly, individual general practitioners cannot be expected to keep abreast of all areas of medical research, including that of wine and health.

What the practicing physician needs is a set of appropriate guidelines based on a thorough review of the currently available literature on the subject. Such a set of guidelines must take note of both the health benefits and the risks associated with excessive or abusive wine consumption.

Who could create such a set of guidelines? I can think of no group better suited to this important task than you — the Society of Medical Friends of Wine. So, I will take this opportunity to ask you, in fact to challenge you, to do just that.

Set up a committee to review the available literature and create some guidelines for the practicing doctor who needs the advice in a manageable, condensed form. I am willing to help by providing any requested information. I hope you will take me up on this challenge — for the good of your patients. ■

THE FOLLOWING IS A RESPONSE

Dear *PWV:*

We are delighted that you are publishing Dr. Waterhouse's challenge. Our Public Policy Committee, with Dr. Keith Marton (Chair), is developing healthy drinking guidelines and studying research on the health effects of alcohol and other components of wine (antioxidants and ethyl carbonate in particular). This work will provide the basis for the Society's position.

Edwin L. Carlson, M.D., President,
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Shoemaker continued from p. 63

in training, and they tend not to read outside their field of specific interest. Information about wine and health, like many other medical breakthroughs, is more likely to come under the physician's eyes in the newspaper than in a journal. As a result, much of this information, will be shrugged off as faddy fluff and pop science.

Keith Marton, MD, (San Francisco, CA) surveyed a number of practicing physicians in a project for AWARE. He identified a surprisingly low level of awareness of the science regarding alcohol consumption, despite the fact that many of those surveyed enjoyed wine in moderation in their personal lives.

Dr. Waterhouse's timely suggestion that knowledgeable medical scientists develop a curriculum on wine and health emphasizes the role of education as a tool far more effective than propaganda (reference most of the current anti-alcohol press) or advertising (which responsible trade organizations have properly shunned).

Paul Scholten, MD, from Medical Friends of Wine and a working group from the Wine Institute have made preliminary steps toward exactly what Dr. Waterhouse has suggested.

In the Wine & Health "Alcophobia" column (***PWV***, Jan/Feb 1993), the following four points were listed as scientifically supportable and "safe" comments a physician could make to his or her patients regarding alcohol consumption:

1. If you are a healthy adult who consumes alcohol in moderation, continue to do so.
2. If you are an abstainer, there may be a good reason for that. Before altering your dietary and beverage choices, discuss your concerns and the issues with your doctor.
3. If you are a heavy drinker, you should decrease your consumption to one to three drinks per day. Above this level, the risk of accidents and serious illnesses may overshadow any benefit from cleaner coronary arteries.
4. If you cannot reduce your consumption, you are in danger, but you are not alone. Please see your physician and be frank about your concerns.

Based upon the science published in the four years since this column appeared, several additions can now be considered:

5. Certain individuals have extraordinary risks of premature death from heart attack, including men with very low HDL (high density lipoprotein), a high cholesterol level, and

Continued on p. 66→

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Shoemaker continued

a positive family history for early cardiac problems. Other high-risk individuals may have abnormal cellular response to insulin with manifestations of obesity, high blood pressure, and accelerated hardening of the arteries, sometimes called "Syndrome X."

For these individuals, even those who have previously not consumed alcohol by personal choice, a small daily amount of an alcoholic beverage with a meal offers preventive attributes equal to or greater than — and additive to — the generally accepted strategies of smoking cessation, weight reduction, dietary fat modification, moderate exercise, and post-menopausal estrogen replacement.

How much alcohol is required? One-half drink per day suffices, up to a safe limit of two to three for men, one to two for women, depending upon weight.

6. Individuals who have already experienced a cardiac event, unless there is a specific reason *not* to drink, should drink a small amount daily. This strategy is as effective as the use of small amounts of aspirin and, in fact, is synergistic if both are done.

Let's deal with facts, not phobias (Echoes from 1993)

In the 1993 ***PWV*** column, "Alcophobia," we told readers the following, which is still true today:

"It takes seven or eight years after college to become a specialized medical practitioner and perhaps another 10 to really polish the art. Among the features that distinguish the wise physician are the ability to balance risks and benefits, to understand the dose/response relationship of hundreds of medicines with thousands of diseases, and to present that information to the individual patient with discretion and compassion.

To accomplish these goals, modern physicians need a flow of facts. Facts are not positive or negative. Facts are facts. Some may solve problems, and others may expose our humble inadequacies. Some may embarrass us, and some may vindicate our opinions, but physicians do not need to apologize for facts.

Doctors must remember that the reason they search for facts is to offer their patients more informed choices." ■

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"The Mediterranean Diet: Wisdom or circumstance?" ***PWV***, Sept/Oct'94, p. 36.

"Fat and the moderate drinker." ***PWV***, Sept/Oct'96, p. 60.

"Corkscrews or track shoes? Eluding the reaper." ***PWV***, Nov/Dec'95, p. 60.

Dr. Shoemaker is a pediatrician, winemaker at Salamandre Wine Cellars in Aptos, CA, and a periodic contributor to ***PWV*** *on wine and health matters.*

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by D.R. Storm, PhD. P.E.

WAR ON GERMS; NEW WEAPONS

Sanitation and cleanliness are second nature to winemakers and their cellar staffs. Winery sanitation is more a continuing battle against organisms that will endanger wine than it is a public health issue, since human pathogens for the most part would find 12.5% ethanol table wine a severely inhospitable habitat.

Proctor & Gamble and Colgate-Palmolive have both introduced antibacterial dishwashing soap to target the potential for infection from improperly sanitized glassware and eating utensils. However, an automatic dishwasher with a sterilization cycle is still the best method for preventing the transmission of disease, in my opinion.

Licensed eating establishments must embrace this sterlization technique or face the wrath of health inspectors for violations of public health statutes (low wash temperatures or less-than-clean kitchen workers) which can result in monetary penalties and even closure. Seasoned travelers outside the U.S., where health codes are not as strict, learn to avoid situations where food or drink pose a higher disease risk, or they spend a good part of their trips carrying illnesses along with their baggage.

Since dishwashers are not necessarily a universal part of kitchen equipment, the new antibacterial dish soap may well make a major contribution in family disease control.

"Triclosan" is the proprietary antibacterial agent in Colgate-Palmolive's "Ultra-Palmolive." The "clo" in Triclosan probably represents chlorine as part of the disinfecting compound.

Not to be outdone, the toy industry has created a line of germ-fighting toys. Parents for the last 40 years are familiar with "Playskool" educational toys. The parent company, Hasbro, announced January 28, 1997, that it now makes 15 toys with an antibacterial agent infused into the structural matrix of plastic resin and binding agents. Bringing particularly positive public response was a germ-fighting highchair with a microbe-killing tray.

The special Hasbro ingredient is "Microban" which officials say "stops mold, mildew, fungi, and a wide range of bacteria."[1] *(Sounds as though Microban could be used in the vineyard as well as the winery for bad-bug control.) The author's new book* Winery Utilities: Planning, Design and Operation, *discusses a commercial floor coating that does in fact contain anti-organism biocides which target the types of micro-organisms which plague wineries.*[2]

Backflow preventers:

Function, economics, and statutory history

Part I

Backflow preventers are the rather ugly plumbing arrays, located above ground or street/sidewalk level, that look like something that the designer added as an afterthought. The simplest of such devices can be seen in residential lawn sprinkler systems. Here, a "vacuum breaker" or air-inlet device prevents ponded irrigation water from "backflowing" into the residential drinking water piping, if by some hydraulic anomaly, a vacuum is created in the residential piping network or (worse yet) in the municipal water system street main.

The infusion of the surface contaminated irrigation into either of these piping systems would present a serious public health threat.

The more complex backflow preventers include so-called check valves that consist of a ball, hinged metal disc, or clapper that remains open during waterflow in the correct direction. If the flow reverses (backflow), the clapper or ball closes the pipe opening, preventing flow reversal.

As an additional safety factor in preventing backflow, a vacuum breaker or air-inlet valve (described previously as the minimum protection for residential landscape irrigation systems), is also made part of the composite unit.

The water that remains statically contained in overhead fire protection sprinkler systems becomes stagnant over time and potability cannot be guaranteed. Thus, sprinkler systems for wineries are or should be equipped with backflow prevention devices if the potable water supply piping and fire protection sprinkler piping have a common water supply source or, as at some lucky wineries, are connected to a municipal water works.

What causes backflow?

The backflow phenomenon can be created by two discretely different hydraulic actions:

- Back siphonage — in which flow reversal is created by a negative or vacuum pressure being produced in the uncontaminated supply source, such as described above in the landscape irrigation and winery overhead sprinkler examples.
- Back pressure — which produces pressure in a water user's system that is greater than the delivery pressure of the uncontaminated source supply. (For example, a booster pump is installed in a winery to provide working pressures inside the winery that would be greater than the municipal or other water-source supplier provides at the service connection.)

Living with backflow preventers

Wineries which have one or more backflow prevention devices installed should be aware that periodic inspections and testing of the equipment must be performed by a certified plumbing specialist. The authority for such testing rests with the first version of the U.S. Safe Drinking Water Act, the National Plumbing Code 1995 edition (if the code has been adopted by the local governmental body having jurisdiction over the winery's water supply matters) or American Standards Association (ASA) A40.8-1955.

A local backflow prevention ordinance, based upon the cited standard codes and statutes, will provide the specific provisions on testing frequency and reporting procedures required in your area. The National Fire Protection Association (NFPA) has detailed testing procedures outlined in NFPA Nos. 13 and 25.[3]

The backflow prevention system installed on the winery's fire protection sprinkler system is the critical hydraulic item in the reliability and unimpaired operation of the sprinklers in the event of a fire. There are recorded instances of spring-loaded check valves in the backflow preventer array remaining closed when a fire occurred.[4] Thus, having backflow preventers inspected regularly is also a boon to the winery and will earn the gratitude and blessing of the local fire chief.

Part II will illustrate the types of backflow preventers that are commercially available and provide a history of the backflow prevention statutes and the approximate cost (1997 price levels) of retrofits, should they become necessary for a winery. ■

David Storm is a consulting civil and environmental engineer specializing in winery utility systems, and the owner of Winters Winery. He is author of Winery Utilities: Planning, Design & Operation, *December 1996. Chapman & Hall, New York, NY.*

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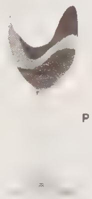

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Environmental factors

The grandbaby called Jake Lorenzo for Father's Day. "Happy Father's Day, Paw Paw," she said. Clear as a bell.

Grandchildren amaze Jake Lorenzo, especially mine. Jakelyn expected to wait a little longer in her marriage before having her first child. To that end she bought a dog, a beagle don't you know. Beagles are great dogs, especially if you are the daughter of a private eye.

Beagles do two things. They hunt and they eat, much like private eyes.

Jakelyn raised their beagle to live inside. That means the dog doesn't hunt. All she does is eat. Beagles are powerful, and they are determined. You don't want to get between Jakelyn's beagle and its food.

The grandbaby grew up thinking that Desiree (the beagle) was her sister. They played together, fought over snacks, and played tug of war with each other's toys. All siblings go through this, but few children have beagles for siblings.

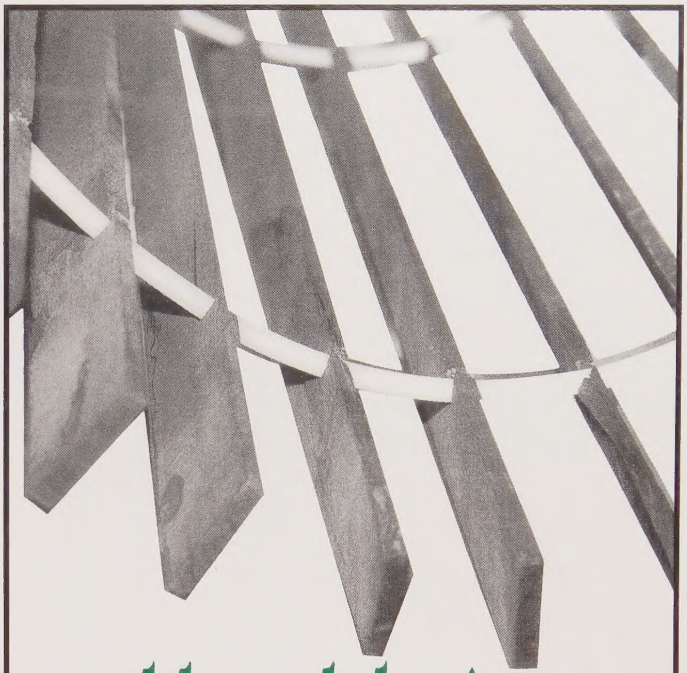
Desiree is tough. Grab a towel and let her bite onto the other end of it, and you can lift her clear off the ground, because she ain't about to let go. Take her for a walk, and even a man of Jake Lorenzo's strength is likely to be dragged along to where she is headed. Grow up with Desiree, and you are stronger than people imagine.

The grandbaby is a cute kid. On the outside, she looks like most other kids. She's not tall or particularly big, but she is some strong. Pushing and pulling against Desiree, the beagle, for her entire life has built up some muscles. When she interacts with other kids and things come to a push or a shove, the other kids go flying. This show of strength is surprising in a petite three year old. Day care workers assess this phenomenon by saying, "She needs to work on her sharing skills."

When the grandbaby has had a rough day and really needs to work on her sharing skills, Jakelyn takes away her computer time.

You see, Jake's son-in-law is a computer whiz kid. Among other things he designs computer programs that allow the computers to talk to their printers. His house is loaded with computers, CD-Roms, printers, and all kinds of high tech equipment that Jake Lorenzo wouldn't even know how to turn on. The grandbaby, on the other hand, has learned all kinds of computer stuff, and she gets righteously pissed off when her computer time is denied. I guess Jake Lorenzo would feel the same way if Jakelyn's mother wouldn't let me drink Pinot Noir with my meals.

The point of all this revolves around the effects of environment upon our individual personalities. Last week Jakelyn's mother and I dined at Babette's here in Sonoma. Fantastic is too weak a descriptor for the food put out by Chef Daniel Patterson. Supremely dedicated to cooking, Chef Daniel oversees every detail from procuring the raw product, to preparing it, and presenting the final dish. The meal begins with some tiny morsel; perhaps a perfectly prepared half quail egg, with the tiniest dollop of a spectacular sauce, topped with a bit of caviar.



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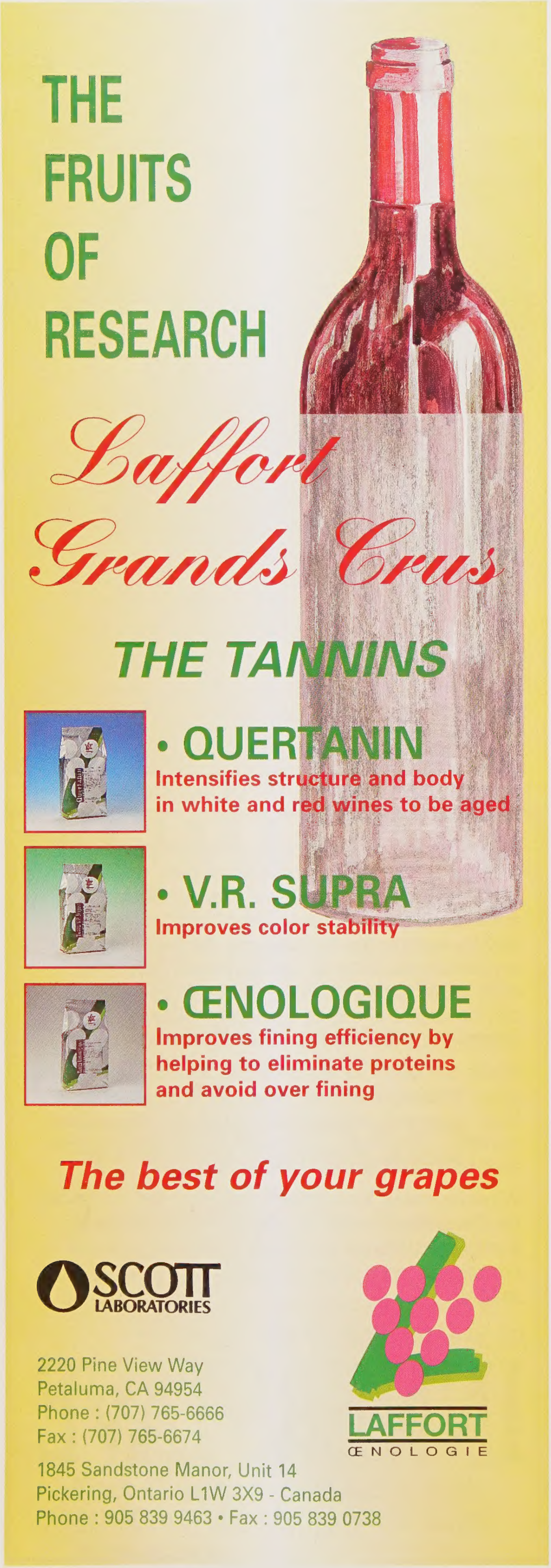
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LAFFORT
ŒNOLOGIE

For a first course, Chef Daniel has devised a chive flan, topped with beluga caviar, served inside an alabaster white egg shell perched on a gleaming stainless steel egg cup. Jake Lorenzo wonders how you even attempt to cut off the top of an egg shell, and then I ponder how many eggs I would break before I got it right.

Next, a perfectly cooked slice of foie gras sits in a pretty dribble of dark brown sauce, decorated with poached, pitted, delicately ripened bing cherries. Each dish is intensely delicious, sublimely complex, and sized so that your appetite hungers for the next course, which turns out to be lamb, crusted on the outside with a melody of herbs, succulent with its medium rare juices, set off with baby Yukon gold potatoes, and tiny carrots woven into a braid by their brilliant green tops.

A choice selection of cheese follows the main course. Each cheese perfectly ripened, and arranged on bright green watercress, or delicately spindled escarole, with the barest hint of olive oil or balsamic vinegar. Desserts are gorgeous, festive, and intense without ever tasting sweet. Coffee is rich, dark. Service is attentive and formal. The wines are reasonably priced and eccentric enough to interest.

After dinner, Daniel sits with us to have a glass of wine. Jake Lorenzo gazes at this culinary master. He is six months younger than Jakelyn. What kind of environment did Daniel come from that made him so dedicated to cooking and fine dining? How does so young a man, determine to challenge himself in so classic a manner?

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The point of this description is that even private eyes are affected by environment. Jake Lorenzo has a prejudice. I prefer things to be small, owned and operated by individuals who pursue their own visions. Chuy's Burrito Palace, while completely different from Babette's, is no less unique and delicious.

When I started to drink wine, wineries were tiny. Individuals worked alone, or with one or two friends, to chase their visions. Jake Lorenzo spends a lot of time searching for tiny, individual operations. I want to buy a bottle of wine and then be able to walk up to the person who made it and shake his or her hand. I want a single person to be responsible, good or bad. I prefer winemakers who do the work themselves, in small amounts, to please their own sensibilities.

Jake Lorenzo doesn't believe that small wineries, operated by winemakers, make better wines than large wineries with huge crews and pages of work orders and whole marketing departments. I do like to believe that if I support these tiny, dedicated artistic ventures, they may succeed and show us a better way.

I've got to go. Jakelyn's on the phone. Evidently the grandbaby has just entered the room with a printout of her latest computer drawing. Since neither Jakelyn nor her husband had turned the printer on for the grandbaby, some investigation may be necessary. ■

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